Finance, a fine art

MICHEL FLEURIET

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A fine art

Michel Fleuriet

Series Editor, Eric Briys

Telephone (+ 44) 1243 779777

Email (for orders and customer service enquiries): cs-books@wiley.co.uk
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Foreword by Sheldon Gordon

I first met Michel Fleuriet in early 1970 when he arrived in Philadelphia to be with his then girlfriend and wife-to-be, Isabelle. She was pursuing graduate studies in Fine Arts at Bryn Mawr College and the University of Pennsylvania. Michel, whose English was so poor that he could not differentiate between a School of Fine Arts and a School of Finance, was provisionally accepted into the Doctoral program at the Wharton School of Finance from which he graduated with his PhD a short three years later – quite an accomplishment in those days for a Frenchman with weak English language background who actually thought he was at a School of Fine Arts.

More seriously, though, I was serving as Business Executive in Residence at Wharton at the time and had the pleasure of reading Michel's doctoral thesis, which dealt with pricing concepts in the bond markets. As I remember, it combined a strong historical perspective with a deep understanding of the workings of the market and raised some thought-provoking challenges to traditional ideas. This was a first glimpse of his appreciation of the fine art of finance.

I followed Fleuriet's career progression with great interest and admiration: an enviable combination of academic and practical finance from his professorship at H.E.C. (the Wharton School equivalent of the French Hautes Ecoles System) to his own corporate finance, merger and acquisition firm, then successively on to senior operating and management roles in Paris at Banque DeMarchy, Worms et cie, Chase Bank,

Merrill Lynch and finally HSBC. Now, in the latter stages of his professional career, with the realization gained from his diverse experience that finance is more a fine art than an exact science, he is able to complete the circle started in 1970 at the Wharton School and share his knowledge with us in this fine work.

Fleuriet paints this book with the brush of a true artist. In the background, he portrays the broad image with his encyclopedic knowledge of the markets' historical development and their workings, including the creation of currencies. On top of this he adds details dealing specifically with stocks, bonds and derivatives. Then he forces us to step back and contemplate the picture he has painted from different perspectives, first from that of the issuer of securities and then from that of the purchaser. Finally, as any good artist would, he challenges us with some different ideas – stock prices are not determined by ordinary supply and demand and perhaps bear little relationship to enterprise value, but rather reflect the interplay of different expectations on the part of buyers and sellers. Moreover, he presents us with the intriguing idea that pessimists and optimists do not have the same market impact and a different way of thinking about who the buyers and sellers of stock are and what their effect is on prices.

Fleuriet also leaves us with some stimulating comments and explanations of the new economy/internet bubble of 2000 and the even more recent Enron debacle. It is indeed a pleasure to experience the work of this fine financial artist.

Sheldon Gordon is Chairman of Union Bancaire Privée International Holdings, Inc. and was formerly Chairman of Rhône Group, LLC and Vice Chairman of Lehman Brothers.

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The marketplace

There exist two basic outlets for investments: stocks through which the investor buys a share in the ownership of the company, and debt when an investor lends to a borrower in return for interest. Either of these alternatives is available in a wide variety of currencies, to such an extent that an investor may have a third choice – which currency to commit to. Hence there are fundamentally three financial markets: the stock markets, the bond (i.e. debt) markets and the foreign exchange markets. Today's capital markets constitute the main way of financing businesses of whatever size and the main outlet for individuals' savings. They are vital elements stimulating growth.

In the sixteenth century there existed nothing tantamount to a stock exchange. Growth was at best fair to middling. That said, international commerce and marketplaces were up and running. They dealt in commodities rather than stock trading – exchange centers they certainly were, but not stock exchanges. Means such as bank notes, commercial banks and market financing have become part of our daily lives, but they were only brought into being at the start of the eighteenth century. Historians trace the beginnings of the Industrial Revolution to that era. This is hardly coincidence – it was thanks to finance that this great leap forward was able to get underway. The Swiss historian Paul Bairoch elaborates as follows:

> Industrial revolution, mother of the world that is, mother of opulence and yet also of present-day misery; the agonizing

> vicissitudes of the Third World are likewise to a great extent the result of the Industrial Revolution.[1]

On one side were the enriched, on the other the impoverished. This presents both victories and quandaries. It is little wonder that financial markets, currencies and banks are simultaneously taken to task and awarded honors.

Many economists – especially in Europe – are intuitively opposed to the role of markets, which are alleged to have favored rampant poverty, endemic inequality and worldwide suffering. They believe that the state should fight the markets. They are wrong – it makes no sense to depict the market in opposition to the state. As for so-called free-market economists, they have put forward a hypothesis that should also be called into question:

> When men and women find it advantageous to exchange among themselves, they create the practical means of exchange. The Bourse is one of them. Even though excessively regulated in our epoch, the Bourse is in reality a spontaneous creation, as is any market.[2]

In reality, it seems that capital markets originated through the iron will of the sovereign, which had nothing whatsoever to do with spontaneous generation! The lesson of history is that governments have favored the growth of markets as a way of financing their needs. Even today, markets develop with the complicity of the state.

A second serious error pertains to the origin of stock exchanges. Many historians imagine a bourse existing in places that were in fact simply meeting grounds for far-flung merchants and tradesmen doing business with distant lands. Such capitals of commerce may indeed in certain cases have comprised money markets and currency exchange centers, but they did not constitute stock exchanges, at least not until Amsterdam at the start of the seventeenth century.

As a result of these systematic mistakes, a number of European economists have a pronounced tendency to conjoin commodity

exchanges erroneously with capital markets. They fail to realize that these two types of markets undertake business in utterly different if not diametrically opposed ways.

The state and the financial markets

History shows that it is the sovereign who lets the market in. Capital markets are a case in point. The French historian Fernand Braudel argues:

> The modern state that has inherited rather than created capitalism at times favors it and at other times disfavors it; at times the state lets it expand, at other times it breaks it up. Only when it equates with the state does capitalism emerge triumphant, only when it is inside the state.[3]

States resort to borrowing to finance their expenses at times of war, for maritime expeditions or when investing in equipment such as canals and waterways. Karl Marx produced a different analysis of similar facts:

> The system of public credit, i.e. of national debts, whose origin we discover in Genoa and Venice as early as the Middle Ages, took possession of Europe generally during the manufacturing period ... the national debt has given rise to joint-stock companies, to dealings of negotiable effects of all kinds, and to agiotage, in a word to stock-exchange gambling and the modern bankocracy.[4]

The state began borrowing as an alternative to tax collection. In 1157 the Republic of Venice was among the first to issue a loan in order to finance the war against Constantinople. Unfortunately no real bourse existed in Venice. No secondary market acted as a gathering place to enable investors to resell the loans contracted by the gondoliers when they wished to recover the funds invested. And so Venice turned out to be an isolated experiment that could not be duplicated. A secondary or resale market is a place where there is a fair chance of finding investors

interested in buying the shares that you have decided to sell. Its role consists in ensuring the liquidity of finance-based assets. Liquidity is the ability or ease with which investments can be converted into cash with little or no loss in value. A secondary market is the one and only way to transform public debt instantaneously into cash.

A secondary market also assumes an even more vital role. It quotes a price that serves as a reference when new securities are issued on the primary market. Such revaluations are useful. They represent the difference between on the one hand a nebulous mass of peripherally applied raw data, and on the other hand a lodestone of information supporting decisions either to invest or to save. However, unlike the primary market, the secondary market does not provide new funding. The fact that a stock exchange does not finance productive investment is not accepted by the public at large. The stock market is seen as a casino that plays no positive role in the financing of the "real" economy.

Just read Braudel as he quotes Roland de la Platière, Minister of the Interior in 1791 at the time of the French Revolution:

> Paris is exclusively stocked with sellers and stirrers of the money pot, with bankers, with people speculating upon papers, upon national debt, upon civic misery.

It perhaps bears mentioning that as of 1789, no more than five stocks were quoted in Paris! Braudel nonetheless goes on to add:

> The rapid conversion of paper into money and vice versa is most certainly one of the main advantages of duly constituted stock exchanges.[5]

To bring us back to the present, following the terrorist attacks on September 11, 2001 that destroyed so many lives, obliterated the twin towers of the World Trade Center and aggravated the forecast American recession, the US federal government took the speediest and most efficacious stimulatory measures ever attempted in a fight against depression. In reality the reflationary program had gotten underway

eight months earlier and included a package comprised of new government outlays (pump priming), tax cuts representing close to 2 percent of gross domestic product and, from a monetary standpoint, interest rate reductions reaching an overall figure of 4.5 percent. Especially in Europe, various economists viewed this as a return to "Keynesianism" in US economic policy. Long-time advocates of the latter, they had previously inveighed against the so-called "uncontrollable power of the markets". Many of them believed that they were witnessing the return of the state, not only in world affairs but also on the scale of national economies. They heralded the return of massive public interventionism. The financial markets are in fact inseparable from the power of the state.

From the end of the First World War to the end of the 1970s, western states had taken on increasing weight in economic activities and apparently spotlighted the end of "laisser-faire" ideology via the implementation of ever stricter laws and regulations. It seemed as though market forces were insidiously giving way to public monopolies. Around 1980, the public domain grew abnormally large in countries such as France and Germany (at the time French President Valéry Giscard d'Estaing and German Chancellor Helmut Schmidt spoke to each other in English, instituted Daylight Saving Time and inaugurated the annual G7 discussions). In 1981 the French elected François Mitterrand as President and thereby powerfully endorsed his long-standing nationalization platform. Only later did it become evident that voters were convinced that state control of businesses was tantamount to bringing foreign firms under the wing ... of the nation!

A few months before, UK Prime Minister Margaret Thatcher and US President Ronald Reagan had come to power as outspoken and unabashed proponents of the free market. Their entrepreneurial orientations prompted both of them slowly but surely to endeavor to keep the state out of business (or at least to adopt a "hands-off" attitude). And quite naturally, the market jumped in with a loud splash. In numerous cases the very usefulness of public services was resoundingly called into

question. Some pundits saw the government as part of the problem and recoiled from deeming it part of the solution.

It was only after the September 11 atrocities that Americans were made aware of the fact that security in their airports had been privatized. At the same time, the British were forced to reconsider their denationalization in the 1980s of the accident-prone Railtrack, which runs the country's railway infrastructure network.

Up to that time, the market had been promoted as youthful and sporty; government had been cast as a dusty bureaucracy, a thing of the past, an ancient relic. As for Europe, in the late 1990s an overwhelming majority of intellectuals castigated Yankee-style economic "ultra liberalism" as the reign of a market stigmatized as anti-state, hostile to justice, against freedom, opposed to *Homo sapiens*. New York was said to symbolize this predominance of unchecked capitalist dollar-generated lust; Lower Manhattan reaped what had been so lucratively sown. Such specious reasoning would be merely nauseating were it not for the fact that it is taken seriously by too many deep (therefore European!) thinkers who ought to know better. Detractors of the market should criticize the state as well.

Critical questioning of the role of the state leads to a redefinition of its basic missions: health care, safety, education and the struggle against exclusion. It entails that maximum effectiveness is ensured in these areas. A government that was unable to keep New York or even Washington safe must evidently endeavor to make up for the all but incalculable material damage. The state may not be able to prevent exclusion; it should nonetheless be called on to succor the newly excluded.

Modern-day free marketeers are not opposed to state intervention in so far as a government is compelled to put into practice efficient and transparent regulatory mechanisms enabling a market-based economy to obtain optimal production and wellbeing. The state must be strong enough to guarantee unfailingly the rule of law that safeguards our fundamental civic rights. It has got to foster and further health,

security, schooling and at least a fighting chance of the inclusion of citizens whose degree of freedom may be measured in terms of the responsibilities they have come to exercise effectively.

The other main role of the state is regulatory. It bears pointing out that financial markets cannot possibly function without strict and stringent rules. The *de facto* reign of the market requires law and law enforcers. Financial markets demand a duly regulated environment. The state has got to guarantee the stability of the latter and the respect of enacted and ratified laws. The financial markets are not a spontaneous creation, nor are markets in general.

The capital cities of trade and commerce

In ancient times, it was simply not possible to borrow or lend money. Up until at least the fifteenth century, Catholic doctrine taught that interest-bearing loans (usury) contravened divine law. For Saint Augustine in the fifth century, such lending represented a crime. Saint Thomas of Aquinas fully concurred. So did Martin Luther, for whom interest figured as a master contrivance of the devil! According to the Old Testament, the best loans were free of charge. In everyday practice, the law forbade lending to a brother because such "help" might actually enslave him. In the society of the Christian Middle Ages, you could loan money to your needy brother but had no right to exact interest.

The prohibition of credit led to a paralysis of commerce. The great Belgian historian Henri Pirenne emphasized the ways in which the markets of the Middle Ages allowed for local production to be achieved within a forcibly limited framework:

> From the ninth to the eleventh century, the plethora of markets appears at first sight to contradict the commercial paralysis typical of the times. Markets may have sprouted, but their huge number bore proof of their insignificance. The usefulness of these small

> gatherings was limited to the satisfaction of the household needs of nearby dwellers and also, no doubt, to the satisfaction of the sociability instinct inherent to all human beings. These meetings constituted the single distraction afforded by a society that the tilling of the soil immobilized. The fact that Charlemagne wouldn't allow the serfs of his lands to "wander about the markets" goes to show that they were enticed much more by a desire for good times than by a concern over trading.[6]

This type of market economy is characterized if not defined by exchange, by barter. One set of wares is converted into another, and not into a common currency. Only commerce with faraway cities and countries could make money indispensable, and that is both the mainstay of war and the tribute paid to peace. The verb "to pay" is derived from the Latin term *pacare*, that is "to pacify"[7] through concluding a pact, to secure peace.

Another author writes in a recent treatise:

> A pernicious hypothesis in the understanding of economics consists in framing its evolution through use of a model casting barter as becoming monetary as development carries on.[8]

In fact currency is merchandise. When you put goods up for offer you demand money.

The historian Karl Polanyi explained the fundamental role of foreign commerce.

> In all truth, the logic is almost inverse to that which props up classical doctrine. Orthodox teaching took as its point of departure an individual's propensity to barter; the very need for limited local markets was deduced from that postulate, as was the division of labor. Commerce between local markets was then said to be called for, followed by commerce abroad and then overseas trading. Given the state of our present-day knowledge, such reasoning should perhaps be turned upside down. The real point of departure was

> long-distance dealing, a result of the geographic localization of goods, and the division of labor stemming from that localization.[9]

In fact, trade in the Middle Ages developed not under the influence of local exchanges, but rather on account of commerce abroad. The vagabond sailor and the foreigner played leading roles. As for the French *bourg* (borough, market town), it was basically a large village; this term yielded *bourgeois* but was originally derived from the Latin *burgus*, a fortified castle in the Germanic languages, a fortress erected on a border. Trade is predicated on ports. The "wik" or similar suffix in the names of English and German towns is a precise designation of a trade center located in a port of entry, a haven (think of Le Havre, France) for commerce in all sizes and shapes. Let's listen once again to Fernand Braudel:

> Whether intermittent or continuous, these elementary markets spanning from country to city represented the most sizable part of visible exchanges. The urban authorities consequently took full control of their organization and surveillance; for them, it was a vital question.[10]

These dignitaries went on to determine the perimeters of such trade centers, their periodicity and opening hours; they were also in charge of overall trading conditions and the establishment of a fair price. Braudel goes on to add:

> Just about everywhere, intensified exchanges made towns construct "halles", that is to say the covered markets often bordered by those of the open-air variety. Most of the time they were permanent and specialized markets.[11]

In the US this "hall" has long since been converted into a "mall"!

It is easy to see how marketplaces and trade fairs came into being, but what about the capitals of commerce? Geography helpfully explains how and why. From 1381 up to about 1500, Venice was the gateway to the

Orient. This canal town redistributed merchandise and money flowing from the Far East. Given the power of its fleet and the number of its galleys, Venice was the great wholesaler of the commercial world. Three major events put an end to this state of affairs: the Islamic conquest of the roads to the Orient, the Portuguese discovery of maritime routes also leading eastwards, and Spain's discovery of America. Here is what the French encyclopedists reported:

> In 1492 Christopher Columbus, a native of Genoa, discovered America at the bid and behest of the king of Castilla, whose subjects came together to conquer the treasures of this new world. In 1487 Barthelemy Diaz, a Portuguese captain, rounded the Cape of Good Hope and opened up the route to the East Indies. After which Vasco de Gama explored and conquered the peninsulas within and beyond the Ganges; Lisbon was the exclusive outlet for the spices and rich productions of these countries that it had distributed in Antwerp.[12]

The wars involving Christian Venetians and Islamic Turks took their toll and other factors likewise contributed to the dethroning of Venice. The maritime "spiceway" passed through the Indian and Atlantic Oceans and not the Adriatic Sea, which neighbors Venice. After the discovery of America, silver mines began operation across the ocean. Located 55 miles from the North Sea, Antwerp evolved into the preeminent Northern European harbor facing the Atlantic. It became the warehouse, the entrepôt port for the pepper that Portugal imported via the Atlantic from the start of the sixteenth century. Wool and timber likewise docked on what is now the Belgian coast. And little by little the silver extracted from South American mines came to be shipped to Spain en route to Antwerp.

This state of affairs prevailed for close to a century. The insurrection of Antwerp against its sovereign led Spain to make war on this capital city and take it over in 1584. The Spanish closed off and effectively shuttered its single window to the ocean. They were endeavoring to redirect

international trade towards other towns in the provinces of West Flanders. Yet their arduous efforts failed to pay off. The real winners were the erstwhile enemies of the unfortunate Flemish. Holland and more particularly Amsterdam came to the forefront as regards navigation, woolen cloth and linen. England achieved predominance in the silk trade. Overall, Antwerp relinquished its status as a center for international commerce. It was initially supplanted by Genoa, Italy, a large seaport that developed into a prime money market for foreign exchange and international payments. Neither Antwerp nor Venice had ever managed to function as such. Braudel succinctly explained:

> From 1579 onwards the Genoese fairs of Plaisance became the clearing house of virtually all European payments, and yet the extraordinary venture of the Genoese bankers lasted less than half a century; by 1621 it was all over.[13]

In the 1620s international activities were reoriented towards Holland and Amsterdam (the founding of New Amsterdam, which was later to become New York, dates from that decade). This state of affairs remained the case for nearly two centuries. Thanks to its superior maritime position from the Baltic Sea to the Near East and as far towards the Orient as Indonesia, Amsterdam held sway for a century and a half in the field of fine spices imported from the Far East. And so it was there, in the Dutch metropolis, that the first bourse worthy of the name came into being in order to quote the shares of a particular company, namely the V.O.C. (Vereenigde Oost-Indische Compagnie), the East Indies Company.

The historian Immanuel Wallerstein goes on to explain that when the Dutch created the V.O.C., they were intent on short-circuiting the Spanish. The latter had annexed Portugal in 1580 and conquered Antwerp in 1585. The spice trade, previously under the control of Portugal, bypassed Lisbon on the way to Antwerp. And when that town fell to the Spanish, the spice market became established in Amsterdam. That said, the Dutch needed to be competitive with the henceforth Spanish-dominated Portuguese, so they embarked on their initial

shipments in or around 1594. Seven years later, Amsterdam endowed the V.O.C. with a charter that would allow it to bring into being an economic and political instrument of use in the ongoing struggle against Spain. The story is told at length in the *Encyclopédie*:

> The prohibition of the ports of Spain and Portugal to the subjects of the United Provinces brought both their distress and their fortune to a peak. Four vessels having departed from Texel in 1594 and 1595 went searching in India under dire conditions for merchandise of which these provinces were altogether deprived. Still too weak not to be pacific merchants, these deft republicans took an interest for themselves in the Indian monarchs who were groaning under the imperious yoke of the Portuguese. The latter vainly applied force and cunning against their latest competitors who were incapable of disgust. The first use to which the Dutch company devoted its wealth consisted in a well-timed attack upon their foes. As early as 1605 their initial efforts allowed them to conquer Amboine and the other Molucca (Spice) Islands. Once they were ensured control of the main spice lines, their conquests were enormous and fleet, the Portuguese were vanquished as quickly as the Indians themselves, for whom these new allies soon took the form of yet more rigorous taskmasters. Other Dutch traders had previously endeavored with comparable success to share commerce in Africa with the Portuguese. In 1609 a 12-year truce was concluded between Spain and the United Provinces, leaving them with the time to enhance and tighten their "trade hold" throughout the world. By 1612 they had brought about highly advantageous surrenders in the Levant. And in 1621 Holland's conquests came with the war. A new trading concern going by the name of the West India Company took over portions of Brazil, of Curaçao (the main island of the Netherlands Antilles) and of Saint Eustache and made great inroads upon the trade activities of the Spanish and the Portuguese.[14]

The historian Stols (quoted by Wallerstein[15]) goes on to explain that the setting up of these two companies may be deemed a form of unannounced nationalization, an attempt to place internationally oriented commerce under the aegis of a national monopoly. The same policy was followed in England. In the reign of Queen Elizabeth I the English inaugurated trading with towns of the North and the Baltic Sea, including the major German port of Hamburg. They were vying with the Dutch, but when it came to the East Indies and Africa they were also up against the monopolies of Spain and Portugal. In 1599 Queen Elizabeth went on to form a company promoting commerce with the East Indies. The company set up trading posts that the state protected with its squadrons. It took possession of Virginia in 1584; by the middle of the seventeenth century it was established in North America. The goal consisted in finding new outlets for English goods in areas where the two Iberian countries had purposefully sought out gold and silver. This conquest of promising new markets had been organized by the state through the creation of state business organizations that benefited from the utilization of public savings, owing a great deal to their quotation on the bourse.

How stock exchanges began

This brief overview of the financial dominance of international commerce by European strongholds allows us to pinpoint the birth of the financial markets. Stock exchanges came into being somewhat later, although historians have had a hard time determining exactly when. "Stock exchange" is a generic term designating a regulated market for shares. One ought to remember that the state has always assumed a prime role in the rules-based organization of stock exchanges. Just think about the way it intervened from the very outset!

A note on the origin of the word "share". In various countries equity shares are known as "actions", a word derived from acting (in law). At the

time of the creation of the V.O.C. shares were called *paerten*, the word being taken from the practice of "participation" in the shipping business. A few years later the word *actie* (from the French *action*) was coined and came into use.

According to numerous historians, bourses opened up in embryonic form towards the end of the Middle Ages. We should nonetheless remember that historians show a pronounced tendency to consider traders' gatherings as a primitive form of bourse. Even when the latter did exist, it revolved around speculation on wares rather than quoted stocks or bonds. The word "bourse" was most likely coined in Bruges in Belgium. The Van der Boerse family ran an inn; sculptured purses or handbags (in French, *bourses*) may have been displayed there. In any event this hostelry was a place where tradesmen, especially Italians, got together and attended to business.[16] The *Encyclopédie* dates stock exchanges (the bourse) back to far more ancient times:

> The bourse that some claim was built in Rome in the year 259 after its foundation, that is to say 493 years before the birth of Jesus Christ, under the consulate of Appius Claudius and Publius Servilius, went by the name of *collegium mercatorem*.[17]

In my opinion too many historians have jumped the gun and given credit where it was by no means due. The so-called bourses were worlds apart from those of our times. They were not actually security markets in which stocks could be subject to negotiation. In the *Encyclopédie* the bourse was defined as

> A public square in the majority of large cities where bankers, traders, courtiers, interpreters and other interested business-minded parties gather together on certain days at a prescribed hour to deal as an assembly with ongoing matters of trade, exchange, allowances, remittances, freight and sundry affairs of this nature pertaining to their trade interests as much on land as by sea.[18]

Once again traders were gathering *en masse*, as had been the case at the Van de Boerse inn. For Braudel it is enough that money changers, tradesmen and public notaries arrange a meeting and construct operations around goods, exchange transactions, holdings and marine insurance to characterize a bourse. Unfortunately such "marts" are merely commerce cafés. They may be exchanges, but there is no *stock* being traded. They are assemblies that cater to the sociability instinct inherent in all people, rather than stock exchanges.

Why all these different terms? Diderot's *Encyclopédie* provides a response by indicating that traders' assemblies bore more than one name:

> In Flanders and in Holland and in several French towns, these areas were called bourses; in Paris and in Lyons, exchange markets; and in the free Hanseatic League cities of the North, merchants' colleges.

A telltale detail is added:

> These assemblies are held with such exactitude, and the presence of traders is so vital, that the simple absence of a man at times places him under suspicion of failure or bankruptcy.

The contract in this case is far more social than economic.

As we have seen, historians are prone to mistake commercial sites for stock exchanges. Here is what Braudel had to say about Venice:

> Two blocks from the noisy stands of the dual marketplace, an observer could locate the city's large-scale traders in their loggia that had been erected in 1455, one could term it their bourse. Each morning they would discreetly state their business, marine insurance, freight. They would buy and sell, sign contracts between themselves or with foreign dealers. Two blocks away, the "banchieri" were installed in their pocket-sized shops, they were ready and able to settle these transactions at once through transfer from one account to another.[19]

Conversations and trades surely took place, but this was not a stock exchange. That is a *bona fide* place where financial assets are officially appraised and it allows investors to resell securities. This simply did not exist in Venice. Money changed hands, but there was no stock market. Again, the Antwerp bourse may have been the first exchange, created in 1460, but it was a commodity exchange and not a stock exchange. On the building itself (1531) was written the following: "For the practice of merchants from all countries and languages." Genoese domination (1579–1621) allowed for the creation of not a real bourse but a financial market, the undisputed center of international monetary movements (a role assumed by London much later, in the twentieth century). From 1579 through 1621 Genoa functioned as the hub of international currency movements. Neither Venice, Antwerp nor Genoa bears comparison with Wall Street.

Braudel takes us on a tour of the rest of the world at the time:

> The lands of Islam; India, China ... Markets were indeed to be found everywhere, even in just roughly outlined societies, in black Africa, in the Amerindian civilizations. Islam countries featured large centers of commerce, bazaars such as the Besestan in Istanbul. The Mecca fair was especially preeminent. A veritable network of payment and credit connected far-flung Moslem towns and cities and yet in contrast to Europe, the need for a hub to centralize payments and do the clearing had not necessitated the existence of a fair. In India not a single village was devoid of its market, they transformed taxes paid in kind into dues in money for the Great Mogul and his plenipotentiaries, his seigneurs. India was a peerless example of a territory dotted with fairs, with interconnected commercial and religious halls of commerce and worship. As for China, it was covered by a grid of markets, peddlers and nomadic artisans drifted from one place to another, but aside from the Mongolian frontier and the port of Canton, true fairs essentially did not exist. Nor for that matter did

> a bourse effectively function in any other country outside of Europe.

Braudel drew the following conclusion:

> To sum matters up, when we compare it to the economies of the rest of the world, Europe's more advanced development appears due to the superiority of its instruments and institutions: the stock exchanges along with various and sundry forms of credit.[20]

Only during the spectacular rise of Amsterdam did the fair give way to true stock exchanges. As early as 1521 the Amsterdam bourse traded in wheat, herring and spices; not a single security was listed. Only with the advent of the V.O.C. were investors at long last in a position to recover their money at will by having their shares put up for sale on a bourse.

In 1688 Joseph de la Vega, a Portuguese Sephardic Jew residing in Holland, published *Confusion de Confusiones*, a Spanish-language book providing minute details on the functioning of the Amsterdam bourse at the time. In his introduction to the German translation of the work, Hermann Kellenbenz writes:

> When de la Vega published his book, the trade and speculation in stocks had not existed the length of a single century. To be sure, speculation in goods was older. As early as the middle of the sixteenth century, people in Amsterdam speculated in grain and, somewhat later, in herring, spices, whale oil, and even tulips. The Amsterdam bourse in particular was the place where this kind of business was carried on. Trade and speculation in shares first appeared there when, in 1602, the six local "chambers" for East Indian trade were united into a general Dutch East India Company. According to the official pronouncement, every inhabitant of the United Provinces had an opportunity to participate in the Company ... The possibility of trading in these "participations" was assured by the fact that each owner of shares could, by payment

> of a fee, transfer his holdings, in whole or in part, to another person.[21]

The *Encyclopédie* provides a description of the building itself (constructed in 1611) that could well apply to today's Wall Street:

> The bourse of Amsterdam is a large building of brick and hewn stone, it is 230 feet long and 130 feet wide, and around it there reigns a peristyle crowned by a gallery twenty meters in height. The pillars of the peristyle are forty-six in number, all of them noted from one through forty-six in order to distinguish the merchants' stalls and to help locate those with whom they had dealings; this would otherwise have been quite difficult, for the building had a capacity of 4,500 people. The bourse is open on every working day from noon until 1.30 or 2 pm, the opening is heralded by the ringing of a bell. At 12.30 its doors are closed; entry is nonetheless possible until 1 o'clock through remittance of a fee to an authorized clerk.[22]

So it was that a goods market found itself transformed into *the* bourse within whose walls shares of the East India Company were regularly exchanged. It is easy to understand why many historians have trouble making a distinction between a market quoting goods and a market quoting stocks. Later on we will make it clear that they operate according to irreconcilable forms of logic.

In any event, the Amsterdam bourse assumed an essential role in the ongoing administration of a capital city. The aristocracy of Regents governed in the interests and even in accordance with the directives of its businessmen. It also came to the forefront of refinancing and capital circulation by dint of successfully procuring the necessary liquidity.

Amsterdam remained the prime international financial center through the end of the eighteenth century, at which time the French Revolution allowed for the emergence of other financial centers in Hamburg,

Frankfurt, Berlin and Paris. But even then, Amsterdam was still the world center for international debt.

Yet slowly but surely, London eclipsed all these cities and came to be viewed as the master of the financial universe. This was due to the country's financial power and more particularly to the fact that its chief urban center was widely perceived as a true example of political stability. There were few cumbersome regulations and the city was largely open to foreign activities. By the fifteenth century London had truly become the economic and political center of England. In 1554, thanks to Thomas Grisham, Elizabeth I's Chancellor of the Exchequer, the Royal Stock Exchange came into being. The queen both named and inaugurated this venerable institution. As the capital of an island that had made a vocation of being independent of the European continent, by the fifteenth century London had indeed achieved a sizable degree of emancipation from Antwerp, for example, and later from Amsterdam.

It also bears mentioning that given its geographic location and the prevailing western winds, Amsterdam and its ships often had to put in at English ports. Pressure could thereby be exerted on the Dutch. The 1688 revolution in England represented the advent of Dutch-type business. In 1689 the Dutchman William of Orange became king of England, of Scotland and of Ireland. The war between Holland and France that had begun in 1688 turned into a war pitting England against France. The victories of the former over the latter in numerous military struggles ranging from 1713 through 1815 confirmed the economic preponderance of London in Europe.

It should also be pointed out that over the course of the 1689–1713 wars, the English got the better of the French by setting up a system of long-term public debt, that is a system predicated on public savings. The economist John Hicks was convinced that such developments explain the success of the Industrial Revolution in the UK. As early as 1786 the renowned English politician William Pitt was quoted as being "persuaded that the vigor and the very independence of the Nation are founded upon this question of public debt". Such functioning demanded both state

"credit" and broad-based public "trust". Debt could exist only thanks to Parliament's drawing up new revenues allocated time and again as regularly scheduled interest payments. This is now known as securitization, the transfer to investors of sources of revenue. It is most decidedly not a recently developed financial mechanism. None other than Karl Marx quoted from the memoirs of the Count of Bussy-Rabutin, a celebrated seventeenth-century French gentleman and lover, who had suggested to Cardinal Mazarin, then French Prime Minister, that he place with investors the taxes collected from the Nivernois province. Mazarin is said to have answered that these future revenues already guaranteed the annuities of City Hall!

The English system was principally based on the development of a secondary market for the national debt. Such operations clearly necessitated a bourse. Marx goes on to explain that the Bank of England managed to create a true currency by dint of the short-term loans it received from the public. Lenders could either be reimbursed at will or else hand over their claim to another lender. Little by little they came to accept bills from the Bank of England as a legitimate means of payment. With the funds received, the latter could effect loans to the state and replace it as the payer of interests on public debt.

> It was not enough that the bank gave with one hand and took back more with the other; it remained, even whilst receiving, the eternal creditor of the nation down to the last shilling advanced. Gradually it became inevitably the receptacle of the metallic hoard of the country, and the centre of gravity of all commercial credit. What effect was produced on their contemporaries by the sudden uprising of this brood of bankocrats, financiers, rentiers, brokers, stock-jobbers, &c., is proved by the writings of that time.[23]

In fact, the Bank of England was transforming monetary deposits into long-term debentures. It made better sense for the state to issue bonds directly, provided that a transparent liquid market was fostered and furthered.

The Bank of England was founded in 1694, during the same epoch that the East India Company was reorganized in the form of the United East India Company and a new South Sea Company was brought into being. All three companies were compelled to grant the state long-term loans in exchange for recognizing their privileges.[24] This public debt system turned out to be superior to the open or floating debt system that the French had invented in the reign of François I in the early sixteenth century. It was perpetual yet redeemable and quoted on the London Stock Exchange. Up to that era public debt had been short term and agreed on by a banker. In order for the public to agree to invest in long-term debt, it was necessary that savers were sure that they could draw interest and be reimbursed. It also mattered that in case of need, they would be able to convert their claim in the state into readily available cash.

A liquid-based secondary market was enough to acclimatize long-term debt. "What a miracle: it is not the state that refunds, the creditor recovers his money at will."[25] Annuities drawn from the coffers of the English state would expeditiously devolve into required additional currency. It is worth stressing again the role of the sovereign in the genesis of a financial market.

A bourse may stem from totally private initiatives, but it aims nonetheless to facilitate governmental financing. Consider the origins of the New York Stock Exchange. This renowned market originated in meetings held by two dozen brokers under a buttonwood tree located on Wall Street. What was their objective? They wanted to formalize a fee-based system for transactions concerning the first debt certificates of the just-created federal government.

The farmers and financial markets

Thus a market is a meeting place where traders negotiate – and haggle over – a fair price for their respective wares. A bourse is an identifiable

and readily located place to trade securities. It is a public, transparent, level playing field in some ways comparable to a football gridiron or a baseball diamond. A large number of orders to buy encounter a comparably large number of orders to sell. Securities are at stake.

Just as historians are chronically prone to mistake a ramshackle conference room for a tried-and-true stock exchange, economists are inclined to place urban fruit and vegetable markets under the same vendor's umbrella as the spectacle offered by Wall Street traders. And yet a *stock* market differs fundamentally not only from a food market, but also from a money or a commodity market.

In a typical goods market the buyer and the seller come to terms so that while one acquires the wares, the other obtains monetary recompense. Anne-Robert-Jacques Turgot (1727–81) was a minister under Louis XVI, the guillotined French king, from 1774 through 1776. In 1766 he published his *Reflections on the Formation and Distribution of Wealth*. His writings may have inspired Adam Smith, whose publication entitled *An Inquiry into the Nature and Causes of the Wealth of Nations* dates from ten years later. Here is an illuminating definition of Turgot's cited by Braudel[26]:

> If I offer that which I possess, it is because I desire and am about to request what I have not on hand. If I request that which I do not possess, it is because I am resigned or have decided to supply the market equivalent, to offer either these wares, those services or an agreed-upon amount of money.[27]

Four elements pretty much sum up Turgot's thought: two things possessed, two things desired. A given transaction is comprised of two desires, of two futures. An intermediary arbitrates the present against the future by putting forth these offers; the market awards a price to the desire. As for a commodity exchange, the buyer and the seller likewise wish and endeavor to satisfy their respective desires. The possessor and the acquirer by no means disagree in their appraisal of the future.

Take the example of an apartment put up for sale. The seller is ready to give it up in exchange for a sum of money compensating for the fact that he or she will henceforth be denied use of the apartment. Such use is stipulated in the framework of the rights of ownership. As for the buyer, he or she agrees to pay a price effectively justified by the fact that in the future, he or she will be provided with use and ownership of the apartment. The seller and the buyer agree on a single price serving to achieve equilibrium between two futures, on the one hand what the seller will do with the money constituting the sales price; on the other hand what the buyer will do with the apartment itself. Such a transaction records the meeting of two wills in complete agreement. It is worth quoting Turgot again:

> Exchanging, it is necessary that each party is convinced of the quality and quantity of every thing exchanged. In this agreement it is natural that every one should desire to receive as much as he can, and to give as little; and both being equally masters of what they have to barter, it is in a man's own breast to balance the attachment he has to the thing he gives, with the desire he feels to possess that which he is willing to receive, and consequently to fix the quantity of each of the exchanged things. In a word, so long as we consider each exchange independent of any other, the value of each thing exchanged has no other measure than the wants or desires of one party weighed with those of the other, and is fixed only in their agreement.[28]

The stock market is another story entirely. By definition the buyer and the seller do not share the same assessment of the future. They may wind up agreeing a mutually acceptable price, and yet their expectations are in opposition. If a market exists with its buyers and sellers, this is because there are several ways of envisioning and assigning horizons to times yet to come. Consensus fails to elucidate the reality of the financial market. As concerns the Wall Street stock in trade, the quoted price translates profoundly dissimilar visions. The

seller is convinced that the future profitability of the stock does not justify keeping it at the price at which he or she is selling it (the asking price), while the buyer is persuaded of the opposite. If a goods market ascertains an agreement on terms of trade, an equity market draws on an *agreement to disagree*. Goods markets register and ratify a form of balance, of equality in trade. Stock markets perform no comparable role; quite the contrary, they take into account the *absence* of equilibrium, the *lack* of consensus. A stock quotation is not something congruent; it sheds light less on a common bid for a "fair price" than on the patent fact that the principal parties *beg to differ*. The views of the seller fundamentally diverge from – rather than converge with – those of the buyer.

For this reason the stock market cannot help but oscillate; its up-and-down motion is not episodic but permanent (as may be a form of revolution). Commentators regularly evoke market "correction". What is missing from their analyses is a usable frame of reference. Correcting to what aim? It in no way means resetting the clock, proceeding to regulate a wayward pendulum. A stock market does not gravitate towards this or that cape of good hope or predominant headland.

Most market analysis pertains to the goods market. In the eyes of Adam Smith there is no such thing as a "just price" for anything. Competition occurs on presentation of a gap separating the natural price from the market price. The former is a reflection of production costs; Smith's analysis applies to products, not to financial assets.

Léon Walras invented the law of supply and demand. Supply reflects the cost of production. He states: "Capital goods are artificial capital goods: they are products and their prices are subject to the law of cost of production."[29]

This assertion ties Walras's analysis in something of a knot in so far as the price of capital now seems to come under two laws of pricing: supply and demand (and other factors of production); cost of production (and other produced goods). Neither of the above can be applied to the stock market.

A contemporary economist explains that the market measures the worth "embedded" in merchandise:

> Value is intrinsic and internal to each item, the quantity of labor it contains that indicates the requisite numerical figure. And the relations of supply and demand, that is to say the forces operating on the market, do render this figure evident once the equilibrated position has been reached. That is why, within the classically accepted framework, the market reveals worth to the extent that it corresponds to the equilibrated price. That is how the market makes public what was dissimulated in the womb of merchandise.[30]

Such analyses need be applied only to goods or services entailing manufacturing costs or attendant expenditures, not to equities. What could possibly be meant by the "production price" of a quoted stock? How about the quantity of labor it contains? In what way might competition relevant to production factors give rise to a duly equilibrated price of securities? Financial assets have got to be taken into consideration under other parameters.

Yet the incoherence manifested by more than a few professional economists does not stop there. Just like the price of goods resulting from the confrontation of supply and demand, what happens on financial markets is supposed to stem from the same concatenation:

> Any market is a meeting of profferers and would-be purchasers. With, for the financial [market], the particularity consisting in the fact that the roles are permutated according to circumstances so that buyers become sellers and vice versa. Does this characteristic modify the very nature of the functioning, does it transform behavior to such an extent that two differing analyses are generated, to such an extent that two disunited markets come to be established? Not quite, especially in so far as at a given point in time of observation, the financial market is, in the final analysis

> and just like any other market, but another confrontation of supply with demand.[31]

I once again beg to differ. On a goods market, demand for a product is generated by the desire to possess and consume it. The supply of merchandise is a reflection of the desire to obtain money. On a stock market, demand for a stock is generated by the belief that its price will rise. The supply of a stock is a reflection of its envisioned fall. The resulting stock quotation is by no means an equilibrium price. Prices on a stock exchange do not arise from a consensus; quite the contrary, they are based on the fact that buyer and seller do not foresee alike. I cannot subscribe to a statement such as the following from a well-known French economist:

> The financial market organizes a confrontation of the personal opinions of investors and thereby brings about a collective judgment that shall have the status of an assessment of reference. The price that emerges in this way is by its nature a consensus. The financial market that has established shared opinion as a referential standard thereby produces an assessment of the stock that is unanimously recognized by the financial community.[32]

This is utterly beside the point! In fact the investing community is cleft, split, divided into two. There are those who buy at a stipulated price; conversely, there are those who want to sell. Were a consensus to prevail, there would be neither buyer nor seller; market functioning would be altogether out of the question.

A month after the World Trade Center was leveled by terrorists on September 11, 2001, the Dow Jones Industrial Average, Standard and Poor's 500-stock index and the Nasdaq Composite Index had risen above their previous, pre-catastrophe levels. A short article in *Time* magazine of December 3, 2001 is tellingly entitled: "The Crash that Wasn't". The combined effect of the Twin Towers atrocity, war in Afghanistan, a recession-prone economy, a torrent of layoffs, the terror of anthrax in

the mail and the threat of additional nuclear or biological assaults did not stop the market from going up by over 5 percent only six weeks after the unspeakable disaster. Questions were asked about the market's sanity. An article in *Business Week* wondered whether the market might be suffering from a form of "mass mania" and concluded that this was far from obvious. Prior to September 11 the Federal Reserve had already slashed interest rates no fewer than seven times. This lowering was to allow consumers to save $70 billion worth of interest in 2002. The drop in oil prices could add $70 billion of supplementary purchasing power and tax cuts yet another $70 billion. Last but not least, the days of the bear market seemed to be numbered. In a typical cycle, Wall Street shoots upwards six months before the economy follows suit. Evidently in this case the market was hardly cheap in terms of price/earnings ratios, and yet betting on economic recovery could well pay off. Financial history since 1950 shows that p/e ratios are high at times when interest rates and inflation are low. Bear markets tend to reach their nadir when earnings per share have gone down by 30 to 50 percent, the 30 percent threshold was a reality by the end of September.

That said, these elements are just part of a figure of speech. In reality, the market does not think and in no way translates into a consensus. Just put the word "buyers" instead of "market" in the above-mentioned article and you will be closer to the truth; were buyers suffering from a form of "mass mania"? Don't forget that a group of investors representing an amount of capital exactly equal to that of the buyers happens to reason in an altogether contradictory way. I could have written another article for *Business Week* to put forward the idea that the market was *not* betting on short-term recovery, and so illustrate the point of view of sellers! Layoffs would reduce purchasing power, tax cuts and reductions in interest rates notwithstanding. The price of oil might also once again soar; the Middle East remains a permanent powder keg. As for the terrorists, they have not quite capitulated, and so on. There were storm clouds over sellers – or rather, the market – as we incurred the risk of a recourse to arms, not to mention yet another terrorist attack. Sellers

fretted over the future of the American economy and more specifically worried about the costs forcibly entailed by the latest measures of security. The following week the market indeed plummeted and the same explanations were rather limply put forward.

The public quite understandably has trouble coping with the way the markets seem to undergo abrupt mood swings and change their mind from one week to the next. In fact they are given more credit than is actually due! The two "narratives" could have been voiced simultaneously; one applied to buyers, and the other to sellers. So we come to see that the market is not a consensus. Price quotes epitomize two opposing and antagonistic visions that are expressed at the same time. The problem is that observers are used to favoring the opinion of buyers when the market skyrockets and that of sellers when it "goes south". They may be used to it, but they might as well be comparing apples with oranges.

2

The mechanics of financial markets

In 1996 Wiley published two investment books dating from bygone centuries: Joseph de la Vega's *Confusion de Confusiones* (1688) and Charles Mackay's *Extraordinary Popular Delusions and the Madness of Crowds* (1841).[1] In his foreword to the combined book, Peter L. Bernstein states:

> Nothing in our modern markets appears to make much difference, not the dazzling technology, not the institutional dominance, not the complexity of financial instruments, not the information overload, not the globalization, not the powerful insights of financial theory. Apparently, most features of market behavior today are little different from market behavior in the seventeenth century.

I would venture to disagree.

If there is one major difference between the trading area of Amsterdam in 1688 and today's stock markets, it resides in the insistence on a *level playing field*. Both de la Vega and Mackay describe obscure dealings in opaque markets, maneuvering grounds for armies of brokers with the manners of unrepentant brigands. It could be contended that three centuries later, ruthless human predators remain legion. "Loan sharks" and rapacious exponents of large-scale downsizing undoubtedly abound! It nonetheless bears mentioning that on the bourse, they make less of a killing than was the case in late seventeenth-century Holland. Market

mechanics have in fact undergone continual and sustained improvement. The efficiency of today's financial markets is based on a transparent price-discovery process, allowing for prices to be openly divulged and publicly stated whether in the *Chicago Tribune* or on the Internet.

Amsterdam in the 1680s was quite another ball game. Quoted shares numbered just two. As already mentioned, for Paris in the 1790s there were only five. Asset diversification was out of the question; today this is a basic investment principle. If you could only put your money into two stocks, you were not unsurprisingly – so averred Joseph de la Vega – inclined to bet. Late seventeenth-century brokers going about their business in Amsterdam cafés endowed their profession with an enduringly dubious reputation. It is enough to peruse the following excerpt:

> Our speculators frequent certain places which are called "coffy-buysen" or coffee-houses because a certain beverage is served there called coffy ... One person takes chocolate, the others coffee, milk, and tea; and nearly everybody smokes while conversing. None of this occasions very great expense; and while one learns the news, he negotiates and closes transactions.[2]

Today's market mechanics have grown decidedly more professional. Their functioning is simpler, operations take place more automatically, participants benefit from scrupulously equitable treatment. Two types of mechanism function in accordance with the respective natures of the markets. When the market is predicated on the confrontation of two diametrically opposed views of the future, all the orders to buy can be put together on one side, all the orders to sell on the other. The showdown between the supply side and the demand side produces a price on a regulated stock market. Numerous financial markets lead to the confrontation not of two mutually exclusive points of view, but rather of two differing yet perhaps compatible needs. A bond seller may be in need of ready cash; a purchaser may wish to save for a rainy day. In this case the market organizes a form of negotiation between two needs

emanating from two parties, each of whose requirements are taken fully into account. Indeed, the optimal solution consists in bringing them together as was the case in the bazaars of yesteryear; business is effected *over the counter*. In regulated stock markets prices are established through electronic matching of supply and demand; in non-regulated markets transactions result from direct, face-to-face (or rather, phone-to-phone) negotiation.

Hard bargaining or software mediation

Transactions contracted outside of the market between individual actors are described as OTC (over the counter). They are differentiated from regulated markets in which orders are contracted electronically. OTC markets are by no means limited to financial assets; not only the markets for real estate and art but also those for films shown at the annual Cannes festival are over the counter.

Such bilateral dealings are inseparable from the way we relate to other people. Their origins date from the time of Aristotle and the "agora". Historically they have come to be known as "private", that is unofficial markets. Their existence is due to the fact that once upon a time, organized goods markets found themselves overwhelmed. Fernand Braudel provides the scenario:

> English historians have drawn attention to the important role, from the fifteenth century onwards, side by side with the traditional public market, of what they baptized the private market. Traveling salesmen, gatherers and collectors of wares paid visits to growers. At the peasants they directly acquired wool, hemp, animals on hooves, leather, barley or wheat, poultry, etc. At times they purchased these products in advance, wool prior to the sheep's shearing, wheat while it was still budding. A simple note signed at the village inn or the farm sufficed to seal the

> contract ... Such examples were to be found throughout the world, in the vicinities of Paris and London, in Segovia for wool, near Naples for wheat, in the "Pouilles" (southern Italy) for oils, in "Insuland" for peppers.

The historian is evoking not just European countries (France, England, Spain, Italy) but also those in Asia. He goes on to add:

> The conclusion that this type of trading replaced normal collective market conditions with personalized transactions whose terms might vary arbitrarily in accordance with the respective statuses of the interested parties is unambiguously corroborated by the numerous lawsuits in England about the interpretation of the small bills signed by the sellers.[3]

Conducted on an over-the-counter basis, negotiation functions bilaterally (case-by-case agreement between the parties) and in a discretionary manner (the parties freely agree the conditions for the transaction). What characterizes these markets is the two-sided relationship established today either by telephone or through electronic communication. Agents meet or otherwise remain in touch; they agree to strive to reach a settlement. Operations take place case by case and are quite literally *made to order*. The transaction is a form of haggling and bargaining meant to bring two wills to a workable agreement.

Only when reported and recorded in an official register do bilateral transactions achieve market status. Today's real estate market differs from the bourse in so far as it does not post an *ex ante* bid–ask spread but rather an *ex post* price achieved after negotiation. It is only after the fact that statistics with mean and average figures can and do come into being. The real estate market is an OTC market, as is the market for used cars.

In financial OTC dealings, the intervening parties are banks and they are the parties subject to rules and regulations, not the market. No mechanism prevents JP Morgan Chase in New York from exchanging

dollars for euros with Commerzbank in Frankfurt. The laws enforced in the US and Germany bind – and perhaps tie the hands of – each of these banks; this is not the case in relation to their transactions.

OTC markets operate for foreign exchange, most bonds, money markets and derivative markets. It should be noted that these include the all-important foreign exchange markets and those of government bonds. In several countries today's bond market is basically over the counter. Let's make no mistake; if this is the case it is due to the fact that they do not involve instruments such as stocks in which the roles of the buyer and the seller are symmetrical, laid down in advance and essentially clear cut. In OTC markets, the objective of the transaction counts more than the forecast upward or downward gyrations of the market. One buys dollars on the market because they are needed in commercial dealings; it is not only a matter of speculating on whether it is about to go up or down. In contrast, stocks are hardly required for commercial business.

Since the logic of the equity market is predicated on the confrontation of two diametrically opposed views of the future, their showdown may stem from either direct bargaining (like OTC markets) or a computerized meeting of all the orders to buy and all the orders to sell. The stock market corresponds to the model of an organized market in which *price discovery* results from the ongoing confrontation of a multiplicity of rigorously uniform orders to buy and to sell. This type of market is characterized by standardized mechanisms as regards rules, procedures and processes.

Shares are perfectly substitutable or fungible financial assets negotiated in accordance with the rules elaborated by the authorities. Investors are not compelled to get and remain in touch with one another; lawyers might evoke the absence of *intuitu personae*, a legal term denoting "in consideration of the individual".

An organized market is in fact defined and characterized by a close-knit set of formalized and non-discretionary rules and processes that match (or register for matching) numerous buy and sell interests on a periodical or continuous basis so as to facilitate the conclusion of

transactions whose prices are determined by and through their interaction. There are systems providing a guaranteed venue for these matching multiple interests and they also play a highly active role in price discovery.

Organized markets must satisfy three elementary criteria:

1. They are endowed with formalized, non-discretionary standard operating procedures; orders may not be processed according to the personal whim of a system operator.
2. The operation of orders must be truly multilateral. It cannot be limited to order-driven markets such as Euronext, but has also to embrace price-driven markets like the London Stock Exchange (later I shall elucidate the distinctive traits of these two systems).
3. They have a price-discovery function and do not derive prices from those of some other market or system.

Regulated markets must necessarily be in harmony with these three criteria, the first of which is strict enough to ensure that they fully guarantee quality, reliability and transparency. The European Commission has proposed to fine tune and reinforce the procedure for mutual recognition of regulated markets to avoid having some states recognize as regulated markets platforms that fail to respect these criteria. It is true that banks also develop private platforms, automatic systems executing the orders of their customers. These "automated transaction systems" are meant to function on their own without involving price discovery. The price brought to bear on transactions is found elsewhere. One example is the transmission for execution to a regulated market of the balance of orders received by retail customers at the market price. Another example is the use of algorithms based on quotations in regulated markets.

Why are stocks generally traded on organized electronic markets whereas a majority of bonds are dealt over the counter? Some experts consider that the preeminence of bourses for stocks could be attributed

to the fact that the required concentration compels those involved to put out their orders in an organized market. This was indeed the case in France for many years, although a large share of the country's capital is held by non-residents who are not subject to the requirement of concentration. They consequently could "derive" from the regulated market a substantial portion of its liquidity. It so happens that they did nothing of the sort. The development of electronic markets matching supply and demand for stocks is a relatively recent phenomenon, resulting from a pure and pristine opposition of buyers of equities against sellers in a way that makes it possible to centralize both orders to buy and orders to sell.

How prices are established on organized markets

The process of determining prices on organized markets is connected with two schools of thought. The first is order governed and predominantly European; the second is price governed and generally Anglo-Saxon. For once, the former comes across as the more modern and efficacious!

In an order-driven market, orders to buy and to sell are juxtaposed. The latter are classified in terms of increasing, the former in terms of decreasing prices. Such a market executes transactions for orders to buy formulated at a price exceeding that of orders to sell. Buying curves are placed in continuous opposition to selling curves. Computer-based algorithms may lend a helping hand.

On a price-driven market, several market makers are competing for each security. Each of them puts forward two prices: bid (to buy) and ask (to sell). Of course the second figure exceeds the first. In such a market, there may be as many prices as there are market makers. Those for a small shareholder could differ from those for a professional investor. Retail and wholesale prices likewise might diverge.

In an order-driven market, the intermediary is a *broker* whose role consists essentially in forwarding his or her customers' orders. He does

not influence the setting of prices. His remuneration is limited to brokerage fees.

In a price-driven market, the intermediary is a specialist, a *market maker*. He (or she) makes public the price at which he buys and that at which he sells. His purchase price (the "bid") is always lower than his sale price (the "offer"), thus allowing a profit margin on their turnover.

The Nasdaq in the United States is one example of a price-governed market. Most other large-scale international stock markets are order driven and offer the complementary possibility of market-making transactions for blocks of shares.

The main problem leading to the evolution of organized markets consists in a conflict between the wish to limit their number and the desire to get them to compete with one another. The quest for a maximally efficient and transparent price-discovery process may lead to the recommendation of a mechanism ensuring that, as regards a given asset, all liquidity is concentrated in one market. There would be no way of performing transactions on the security in an alternative venue.

The advantage thereby obtained fails to offset the great drawback that would result from the creation of a monopolistic environment for the benefit of a single market. Guaranteeing a done deal often proves stultifying. It is more important to keep your options open, to let competition stimulate innovation and make the necessary adjustments along the way. Markets must be allowed to compete with one another by being authorized to negotiate the same financial products. For example, in the mid-1990s the US witnessed the development of electronic market systems known as ATS. One reason they thrived was that transactions in the US were price driven with a bid–ask spread and it was relatively easy for an ATS to offer better prices. As for European markets, many of them have set up systems of electronic matching with little room for competitors.

What can we conclude? Whereas in EU countries only 5 percent of transactions are captured by ATS, the comparable figure in the US is no less than 30 percent! This development has fragmented liquidity on American markets.

Bulbs, bubbles and bull markets

In 1841 Charles Mackay (a journalist, essayist and poet) published the first chronicle on speculative bubbles, entitled *Extraordinary Popular Delusions and the Madness of Crowds*. This work tells the tale of the events leading up to the formation of three consecutive bubbles: the creation of paper money in France by John Law (1719–20); the Mississippi Scheme and the South Sea Bubble in England at about the same time; and "Tulipmania" in Holland (1634–36). These three finance-related fads are customarily cited whenever the market undergoes sharp drops (as was the case in 2000 with the short-lived Internet bubble). Written 50 years later, Diderot's *Enyclopédie* refers to the bubble of 1719 as follows:

> One recalls with astonishment, and posterity will hardly believe how in 1719 the stocks of the "Compagnie d'Occident", now known as the "Compagnie des Indes", rose 1900 percent in six months.[4]

In his introduction to a reissue of Mackay's essay, Martin S. Fridson writes:

> Mackay's theme appeals to everyone who hopes to prosper by proving the majority in error. This is a group to which all speculators belong along with purveyors of opinion on a wide array of non-financial issues. In Mackay's book, they find affirmation that the consensus is fallible. The message of *Extraordinary Popular Delusion* goes beyond the mere notion that people *en masse* sometimes behave irrationally. By Mackay's account, the crowd's hysteria is easily detectable by individuals who rely on common sense. Immense profits are to be had if this assertion is correct and Mackay has little doubt that it is.[5]

In other words, speculators are mavericks, contrarians who understand that even though millions of smokers adhere to the same brand, there is no force in mere numbers.

At the 1995 G7 summit meeting in Halifax, Nova Scotia, the French President Jacques Chirac was referring to another type of speculator when he said: "Speculation is the AIDS of our economies". In that case to speculate means to make money with money in the absence of production or commerce. We once again hear a religious note, remembering that interest-bearing loans used to be prohibited (and in some Moslem countries still are). Finance-generated gains are deemed to be ill-gotten; they fail to correspond to activities that create wealth and are likely to contribute to social progress in the real world. The true economy, that of manufactured or otherwise tangible goods, is opposed to the false economy in which capitalism has grown financial and global, virtual and thereby inherently untrustworthy. Stock exchange experts are alleged to be speculators providing inconsistent bubbles with ample supplies of "hot air".

Collective psychology frequently likens the stock market to a casino, if not to a wrestling match in which no holds are barred. As if the former weren't of markedly greater use than the latter! One must not forget that this market organizes information concerning the economy as a whole; it sheds precious light on the broad outlines of the "big picture". Such documentary endeavors create appreciable value. Gambling yields thrills and chills but serves no noticeable purpose.

The *Cambridge International Dictionary of English* gives two different definitions of the word "speculate": "to buy and sell in the hope that the value of what you buy will increase and that it can then be sold at a higher price in order to make a profit"; and "to form opinions about something without having the necessary information or facts; to make guesses." The word also has two sources in Latin. *Specula* is a watchtower; from its vantage point scouts are on the lookout, they watch with a discernible aim in mind. Speculate also goes back to *specere*, to look at, from which root also comes *speculum*, Latin for mirror. Is a modern-day speculator the individual who waits and sees (*specula*) before committing himself, or is he rather someone who tries to guess what the other – his mirror image or *speculum* – is up to? These two kinds of speculators indeed exist.

The first – the one who keeps his eyes wide open – is a long-term investor. He is averse to jumping blindly into the fray. Warren Buffett is an excellent contemporary exemplar. He manages a portfolio containing 8 percent of Coca-Cola, 8.5 percent of Gillette, 11 percent of American Express, 3 percent of Disney, 17 percent of the Washington Post and so on. The annual profit of the capital managed by his company, Berkshire Hathaway, has averaged 30 percent over the course of the last 30 years. Buffett started out with perhaps a dime in his pocket and is now at the head of the second largest fortune in the US. His investing rules of thumb are simple to formulate if not as American as apple pie: to put it in a nutshell, he ferrets out shares whose currently quoted prices are temporarily lower than their fundamental (or intrinsic) worth.

Fundamentalist theory deems that a given financial instrument is endowed with an inherent value that may be determined in accordance with forecasts of flows yet to come. In relation to stocks, for instance, intrinsic value is said to reflect a series of future dividends expected (suspected yet barely glimpsed) by the investor. He speculates in the *specula* (observation-based) connotation of the term. He is anything but a passive if attentive onlooker! His form of observation presupposes imagination, foresight, active interpretation of the way the dice rolls and the ball bounces. We must not forget that determination of so-called fundamental value is based on forecasting and therefore remains highly subjective. Operators are never in agreement about this value.

The other type of speculator takes psychological factors into account all the time. He wants to know what the crowd has in mind. His market behavior anticipates the behavior of other relevant people. It is in that way that he comes to resemble a mirror. He provides a reflection of what John Doe may be thinking. John Maynard Keynes devoted a whole chapter (Chapter 12) of *The General Theory of Employment, Interest and Money* to the state of long-term anticipation. In what way is the market likely to establish the price of shares? The investor is far more interested in how much the market will value an investment at under the influence of mass psychology than what it is really worth to someone who buys it

"for keeps"; so much for intrinsic value and the fundamentals! Keynes goes on to write:

> It is not sensible to pay 25 for an investment of which you believe the prospective yield to justify a value of 30, if you also believe that the market will value it at 20 three months hence.[6]

Even if they endeavor above all to foresee the resale price, investors must also size up group psychology when the sale is scheduled to take place. On this subject, Keynes draws an analogy with beauty contests organized by a number of newspapers:

> in which the competitors had to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponded to the average preferences of the competitors as a whole.

Everybody knows that there are no objective criteria delineating beauty! The winner had to pick not the faces that he himself found prettiest, but rather the photos chosen by the highest number of participants. As a result, the rules of the game did not encourage contestants to assess the qualities of the photos on their "intrinsic" merits; instead they tended to look for the picture most likely to succeed in the equally watchful eyes of the highest possible number of fellow panelists. And since the highest number went on to reason in the same manner, what mattered was to predict the relative incidence of the criteria taken into account by the highest number.[7] Mirror, mirror on the wall, who's the fairest one of all? Was Snow White the apple of the collective eye?

Do market prices fluctuate around consensual equilibrium, the fundamental value? Or are they just a symptom of imitative behavior, as each investor strives to predict and if necessary forestall their colleagues' actions? Many critics regularly depict tomorrow as doomsday, or at least as the outset of a crisis resulting from the pendulum swinging back to the well-balanced fundamentals. Speculators are

said to provoke exuberance and it is claimed that today's markets wrongly diverge from what tomorrow's will clearly and durably articulate.

This frame of mind is shared by economists who are intuitively opposed to the stock market. The common presupposition is that there indeed exists a fundamental value, a viable balance from which the markets at times go astray; speculators serve as life-size punching bags, as convenient scarecrows.

In the stock market, such equilibrium is but a figment of the imagination. A momentary price in no way corresponds to long-standing equilibrium; were this to be the case there would be virtually no buyers and even fewer sellers! The former acquire because they consider the market price unduly low, the latter are convinced of just the opposite. As Joseph de la Vega wrote:

> While philosophy teaches that different effects are ascribable to different causes ... at the stock exchange some buy and some sell on the basis of a given piece of news, so that here one cause has different effects.[8]

Each speculator positions himself today in such a way that at some time in the future, the market proves him right. There is simply no such thing as a fundamental or average value on which all reasonable operators might come to agree. We are all speculators.

One may mock the Internet craze, the speculative bubble that carried technology shares to the summit at the end of the 1990s. One may sneer at apparently irrational market exuberance. And yet, the optimism was not necessarily unreasonable. Why not?

In fact, the soaring of these shares coincided with a heightening of productivity that had led buyers to conclude that we had crossed a threshold and entered a new economic era. The advantage of gains in productivity consists in their creating a boom that will not give way to inflation, whereas a boom generated by heightened demand generally ends with the return of inflation.

Second and more importantly, while there were many buyers – along with their capital – at the height of the bubble, there were also a number of sellers with differing opinions! Optimism did not ride roughshod over the world of finance. This type of dichotomy is not an expression of casual impetuosity; rather it goes to show, once again, that the markets reflect diametrically opposed visions. As for the benighted bubbles themselves, they may be defined as appearing after the event. The sight of one of them simply spotlights which half of the market was wrong. In the bubble between 1999 and 2000, individuals tended to buy while the professionals were inclined to sell. Retail investors had a pronounced impact on the technology sector with the growth of online investing and the advent of day traders. Wall Street firms took companies public and gave much of the IPO (initial public offering) to institutional clients; the latter then quickly turned their stock over to retail investors, who ended up holding as much as 80–90 percent of some technology IPOs at the time of the boom.

Stock market assessment mechanisms develop a form of self-referential rationality; this is more evident in our day than was the case in the eighteenth century. Far more companies are quoted; new ventures are continually introduced. When valuing new shares in the framework of an IPO, existing valuations serve as reference points. It is similar with takeover bids. Such circular or self-based rationality feeds a bull market – one of rising prices – which was especially evident during the technology-driven bubble. As more and more IPOs came to the market, steady valuation inflation took hold as each new IPO was valued in terms of the most recent. The second wave was valued off the back of the first one and fed on itself. There also existed a "broadband" economic link between telecom and high-tech Internet stocks. The Internet was about to become accessible to countless millions of consumers. It was thought that other gadgets, such as wireless devices, would soon grow just as ubiquitous. Investment was lavished on those companies that seemed poised to build up the necessary infrastructure.[9]

On a long-term basis, he who is wrong may end up being proved right. While explaining the origin of the word "bubble", Mackay throws precious light on the subject. He explains that while the South Sea Bubble was gathering steam:

> Innumerable joint stock companies started everywhere. They soon received the name of Bubbles, the most appropriate that imagination could devise. The populace are often most happy in the nicknames they employ. None could be more apt than that of Bubbles.[10]

Mackay goes on to cite some examples of these pockets of hot air whose objective was to draw profit from the gullibility of crowds:

> But the most absurd and preposterous of all, and which showed, more completely than any other, the madness of the people, was one started by an unknown adventurer, entitled, "A company for carrying on an undertaking of great advantage, but nobody to know what it is."

That bubble surely bordered on the unbelievable. And yet when Mackay jokes about a project resembling the subsequent invention and manufacture of plywood, it just might be that the "speculator" deserves the last laugh! We should try to understand and not merely condemn.

Economic history is a succession of boom and bust cycles. According to the economist Laurence Meyer, who was a member of the Board of Governors of the Federal Reserve System, US economic history going back to 1899 may be separated into six periods in each of which a burst of high productivity coincided with a phase of strong and sustained economic growth. The most dramatic was from 1917 to 1927 when productivity rose by 3.8 percent, followed by a gain of only 1.5 percent from 1927 to 1945. During such periods, affirms Meyer, there were equity bubbles in innovating industries. After the First World War, General Motors' stock soared but then crashed once hundreds of competitors sprang up. Airlines also bubbled following Charles Lindbergh's 1927 cross-Atlantic flight.

When an optimistic cycle takes shape, it is the power of the pessimists that grows and finally prevails. That said, it is only after the fact that we can locate a boom's ceiling and a bust's basement. We should keep in mind that in any transaction, especially at the cycle's apex, there exist bullish buyers and bearish sellers. We should also remember that bears are never more active than when everything's coming up roses! Nobody is born a bear; it is not a lifetime status. At any given moment on the market there exist two basic opinions: John Doe vacillates between one and the other, depending on news and mood swings.

Sellers are necessarily shareholders; in the recent or distant past they had by definition been buyers. As of now, they are either winners or losers. And if they are gaining ground, they are in no rush to sell.

As for buyers, they may or may not be shareholders. As long as they are not, they have yet to give a red cent. Price rises have a way of stimulating "born-again" buyers who find few sellers. Increases feed and fuel upsurges. The opposite is true during a downturn. Sellers yield ground and feel the need to cut their losses; there are traffic jams at the exit ramp and non-shareholding buyers get cold feet.

Prices go up when people are waiting for news. The central bank may be on the verge of intervening or quarterly results are about to be disclosed. Markets abhor surprises; they may not want to know what news is on the way, but they must be advised of its imminent arrival. And then it comes! Let's suppose that it is negative, disappointing. Would-be buyers will cry into their beer; as for sellers, winners as well as losers will move into action. The fall will come that much harder: a self-fulfilling prophecy, a vicious circle.

If the news is positive and upbeat, sellers may be much more prone to sell! Lightning does not strike twice. And so the insidious downward slide proceeds unabated. What else is new? As early as 1688, Joseph de la Vega wrote the following:

> The expectation of an event creates a much deeper impress upon the exchange than the event itself. When large dividends or rich

> imports are expected, shares will rise in price; but if the expectation becomes a reality, the shares often fall; for the joy over the favorable development and the jubilation over a lucky chance have abated in the meantime. There are natural reasons for this phenomenon. Whenever the situation is threatening, the bears generally fear the blow, and they do not dare to engage themselves. Meanwhile, the bulls are optimistic with joy over the state of business affairs, which is steadily favorable to them; and their attitude is so full of (unthinking) confidence that even less favorable news does not impress them and cause(s) no anxiety. But as soon as the ships arrive or the dividends are declared, the sellers take new courage. They calculate that for some months the purchasers – the bulls – will not be able to expect very propitious (new) events. So the leaves tremble in the softest breeze, and the smallest shadow causes fear – and therefore no wonder that the shares fall, because they are abandoned by the one side and attacked by the other.[11]

When news items arrive in batches, as was the case in the seventeenth century with the arrival of a ship and in Europe just two decades ago when companies disclosed their results only once a year, it was understandable that sellers took heart when they heard glad tidings. Today is quite another story – CNN and similar media feed us news 24/7.

3

Globalization

At the beginning of the third millennium protests against creeping globalization have frequently degenerated into an introduction to Anti-Americanism. It bears mentioning that originally the protesters were voicing widespread concerns over the environment, financial transparency, food safety and so on. However, at the recent international summit meetings in Seattle, Nice, Gothenburg and Genoa, many demonstrators turned violent as they expressed their systematic refusal of the market economy.

In the immediate aftermath of the US and British bombing of Taliban strongholds in Afghanistan, the Treasury Secretaries along with the major bankers of the Group of Seven convened a meeting in Washington, D.C. Their objective was to reassure the world that the global economy would recover from the terrorist attacks and growth would recur in 2002. That said, Federal Reserve Chairman Alan Greenspan insisted on the extent to which the new uncertainty bred by the unthinkable atrocities of September 11, 2001 was likely to affect the worldwide economy and ongoing globalization.

The emerging insecurity of the early twenty-first century appeared to threaten the globalization that had characterized the end of the twentieth. In 1990 international trade represented just 18 percent of worldwide production; by 2000 this figure had risen to 26 percent and during that year alone world trade had grown by 12.6 percent. Historians remind us that the First World War simultaneously signaled the birth of the twentieth century and put an end to the internationalization

characteristic of the previous decade. In 2001, many economists feared that the global struggle against terrorism would strike a lasting blow to the reduction of tariff barriers (among other things). The free movement of people, goods and capital might be permanently jeopardized. It was felt that risk aversion, higher transaction costs and the delays entailed by security measures would most likely slow down exchanges of goods, services and capital. International migration could come to a standstill.

Globalization has been due to powerful and durable factors that cannot yet be clearly contested. There has been no sign of isolationist withdrawal (surely not in the US) or of protectionism in any important country or economic zone. In a word, globalization is here to stay. That said, the model of high productivity, low-cost financing and controlled inflation is by no means immune from risk. The world is not as safe as was imagined in the developed countries as the twentieth century came to a close. The type of Iron Curtain that cut Europe in two after 1945 is rising again in places all over the world and new divisions can easily be foreseen.

Moreover, the liberalization of financial markets and reluctance to monitor monetary flows have been singled out for blame; didn't they facilitate the funding of terrorist networks? Movements unknown in the United States and yet influential in Europe (such as ATTAC, the Association for the Taxation of Financial Transactions for the Aid of Citizens) have revived projects meant to obstruct market globalization. Their spearhead consists of the "Tobin Tax", excise taxes on cross-border currency transactions whose revenue is intended to go to basic human and environmental needs, named after James Tobin, an economist at Yale University. There is more discussion of this later in the chapter. The banks of industrialized countries are seen to be working hand in glove with governments to reinforce the struggle against "dirty money" (ill-gotten gains, filthy lucre) and the financing of terrorism without thereby interfering with financial markets. In the same way, customs agents are developing new electronic systems to safeguard yet not hinder borders and airports.

The globalization of financial markets is manifested in powerful capital and exchange movements, and also through the internationalization of the markets themselves. Measures nevertheless need to be taken to control the risks inherent in globalization.

Common currency

The most ancient civilizations based their exchanges on barter, that is a trade-off of payments in kind. If a unit of account was needed, it was framed in terms of cereals, most often wheat. Historians date the invention of metal money to the seventh and eighth centuries BC. Diderot and d'Alembert's *Encyclopédie* elucidates the reasons behind the invention: "Simple exchanges of commodities had become impossible, people wished to obtain by dint of a unanimous convention some signs of these commodities rendering their exchange more commodious, and that could be used when they were not present. So that these signs be durable and susceptible to many operations of division without nullifying each other, metals were chosen; and among them the rarest so as to ease their transport. Gold, silver and copper turned into the representation of all things that could be sold and bought."[1]

As late as the eighteenth century, some primitive peoples were still trading feathers and shells. So the *Encyclopédie* mentions the existence of shells used as currency in Virginia:

> The savages of Virginia do not trade in currency but rather with different parts of shells that are polished, and shaped into small pierced cylinders colored brown or white, four or five lines long, and threaded. Some of these cylinders are known as "runtis"; as for "roenokes", they are fragments of scallops. The English receive the brown peak, the dearest, for about ... 18 sols or pennies.

The same work makes mention of the use in India of small shells known as cauris.

Metal currency constituted a true revolution. The metal content of currencies was certified by a political authority, which is the great difference to shells. Money became an instrument of measurement and conservation of value under the aegis of the reigning or ruling powers. Historically speaking, one of the rights of the sovereign has been the privilege of minting coins. Someone who received a piece of silver generally had the impression that they were obtaining nothing other than a token drawing its worth from the sum inscribed on it by the authority of the sovereign.

The invention of currency basically put an end to barter. It replaced the exchange of two products with a sale and a purchase, the exchange of products for money. As Turgot put it: "The use of payments in money has given room for the distinction between seller and buyer."[2] As long as currency comprised wheat, feathers and shells, one could convincingly argue that sale and purchase were still barter. Weren't the exchanged products of equivalent value? The intermediation of money bestows a price on goods. In barter, supply and demand are directly adjusted through modification of the quantities exchanged. In purchase and sale, the adjustment is effected by a change in prices. And yet, in international exchange relations, currencies are still bartered.

Money crossing a border is divested of the power of settlement granted by the sovereign. It is just a piece of merchandise and its exchange value is gauged, as is the case with other exported goods, in terms of the currency of the importing country.

Domestic currency exchanges existed for quite a while in history. There were several reasons for this: in the Middle Ages currency was defined by the power of cities and at times provinces; exchange functioned between one city or one province and another. And yet currency exchange also existed within a single city, province or country when several metals such as gold (almost always alloyed with copper) and silver could be used concurrently. England was the first country to free itself of inland tolls and customs charges; when it united with

Scotland in 1707 and with Ireland in 1801, it unwittingly brought into being a free trade zone.

As for ancient civilizations that had utilized metal currencies, each showed distinct preferences. Silver served as the money of account in Mesopotamia; gold was employed in Egypt. It was only in fifth-century (BC) Greece that we find traces of the first standardized and certified currency, the drachma. Made of silver, it was used practically everywhere in Europe for over five centuries.

At the beginning of the Christian era, the Romans had a tri-metallic system based on gold, silver and bronze; they imposed it around the entire periphery of the Mediterranean. The coins had no certified value but rather depended on their weight. For three centuries this system was undermined by inflation, false accounting and widespread wariness. Only in 368 did the Emperor Valentinian undertake reforms allowing for the monetary system to be rebuilt on the basis of trust. Gold, silver and bronze money was remodeled and certified. Depreciation of the bronze coins favored their use in ongoing transactions and thereby accelerated the transition from barter towards a monetary economy. In the fifth century the invasions of the barbarians interrupted these exchanges.

Four hundred years later, in 781, Charlemagne imposed silver money throughout Europe; in French *argent* ("silver") signifies money. It was only 500 years thereafter, around 1300, that the city of Florence introduced a coin in gold thenceforth known as the florin (after Florence). Exchange relations between florins in gold and silver coins grew problematical. When Duke Guillaume (or William) of Normandy conquered England (in the eleventh century), he introduced Charlemagne's silver-based monetary system: the sterling *livre* (cf. the Latin *libra*) was also known as the *Pundt*; at the outset it weighed a pound of silver. This was still the weight used to balance scales when weighing money in eighteenth-century London.

So originated the equivalence between the weight of the metal incorporated in the currency and its accounting value. Yet this failed

to last. By the beginning of the eighteenth century, this currency represented only a quarter of its weight in silver.

It was then that England opted to adopt a gold – as well as the erstwhile silver – standard; nowadays we would term that *bilateralism*. None other than Isaac Newton decided in 1717 to appraise the pound on the basis of 7.32 grams of pure gold. Poor Isaac – only a little later he lost his savings in the South Sea Bubble and went to express his sense of impotence: "I can calculate the motions of heavenly bodies, but not the madness of people." It was only a century later, in 1821, that England at long last came totally around to the gold standard, that is the possibility of converting gold into gold money with a predetermined ratio and of transforming paper money into gold.

In the meantime in Maryland, a former British colony that had declared itself independent, the dollar appeared. As of 1792 its value was established at 24.04 grams of pure silver and 1.505 grams of fine gold. The historian Paul Bairoch indicates that the word "dollar" is derived from a one-peso Spanish coin that was known as such when it was in wide circulation throughout the Americas. As for the origins of this omnipresent common noun, they date back to Austrian coins, most notably the *Thaler* in the fifteenth century. They also stem from the term *daler or dale* that was applied to coins as of 1517.[3] Even nowadays, in French idiomatic speech worthlessness is expressed in the phrase *Cela ne vaut que dalle* ("Its value is trifling"). The *Rixdaler* was a transportable Scandinavian silver coin whose silver content remained constant and a large silver coin called the Lyon dollar was minted in Holland, thereby paving the way for the rise of Holland-centered trade in the first three decades of the seventeenth century.[4]

It was only in 1900 that the dollar was no longer exclusively defined in relation to gold at its 1834 "standard". Given the fact that the first devaluation dates from 1933, it can be affirmed that for a century the dollar was pegged to gold. Since the Second World War, however, it has relinquished over 90 percent of its worth.

Metal currency has never existed in sufficient quantity; gold and silver mines could never deliver enough. The solution consisted in creating paper money. That said, creation is not necessarily tantamount to acclimatization. In 1107 China issued a six-color bill; for the next 20 years it was printed out by the zillion and thereby caused at least double-digit inflation. This type of domestic bill only disappeared little by little. And yet paper money had been one of the marvels recounted by Marco Polo which, like so many others, came up against the incredulity of westerners.[5]

Given the scarcity of metal means of payment, Europe devised several solutions: the bill of exchange and the instruments of public debt (in the thirteenth century). Also known as a draft, the bill of exchange is a kind of check. To the extent that it may be transferred to a person other than the one expressly designated, it is in practice a form and certainly an ancestor of paper money. This debt note can change hands provided that the issuer is creditworthy enough that successive holders accept it.

The bill of exchange particularly came into its own in Amsterdam. The founding of De Wisselbank van Amsterdam dates back to 1609. This soon evolved into the great European bank for deposit and exchange operations. The economic dominance of Amsterdam had yielded widespread confidence in this bank where sizable quantities of precious metals and metal currencies were deposited. Moreover, precious metals freely entered and exited Amsterdam, which was not the case in other European countries at the time. Keeping a large amount of currency in its strongrooms, the bank developed a system of bills of exchange paving the way for the expansion of multilateral settlements. By 1660 at the latest, Amsterdam had become the incontestable center of a system of multilateral payments; up until at least 1710, it maintained this role.[6] It had grown into *the* clearinghouse for international settlements.

The first bank notes in Europe saw the light of day in 1661. It was a private financial institution, the bank of Stockholm, which put into circulation printed bills destined for the bearers. This experience did not last long; in 1664, following difficulties with these bills, the bank put an end to its activities.

In France, the so-called John Law financial system fell flat on its face. It is necessary to explain how and why. In 1716, the Scotsman John Law persuaded the Regent of France, Philippe Duc d'Orléans, to implement his system that most notably entailed the circulation of paper money as in England. He obtained official permission to create a bank, the Banque Générale, which in 1718 was renamed the Banque Royale. From that date onwards, it issued paper with a value greater than that of its metal reserves. For a few months this system engendered contempt for gold and silver; the *Encyclopédie* characterized it as a "sort of miracle that posterity may find unbelievable". It failed because the excessively lavish issuing of bank notes entailed the loss of two-thirds of their worth in comparison with gold. By 1720 the system had been dispensed with. Then again, given the overall poverty of the times, how could anyone reasonably hope to set up a credit bank trusted by the nation to the extent that it could thrive on issuing paper money? The sad end of the first attempt to introduce bank notes in France left traces on the collective psyche; a second negative experience was represented by the ill-fated *assignats*, another form of paper money dating this time from the French Revolution (1790–96).

The Bank of England deserves due credit for having brought into being a lasting form of bank note, that is an IOU or note issued by a given bank that creditors remit for payment without at any time making a request for reimbursement. It was a private bank whose capital was divided into shares. A law enacted in 1697 had prohibited the constitution of other banks as joint stock companies. From the very beginning (1694), the Bank of England issued transferable and negotiable bills in exchange for some of its debts. Following this, the bills were remitted to bank depositors who in turn remitted them as payment addressed to third parties. This system functioned thanks to the trust bestowed on the Bank of England. The acknowledgments of debt found takers and so it was that the market for bank notes could rise and thrive. Karl Marx explained that the money thereby created with the help of the state contributed to refinancing the debts contracted by the latter.[7] This assertion is indeed

justified; the invention of public debt ensured the financing of the English state and facilitated the defeat of France.

It was only in 1709 that the Bank of England was granted official authorization to issue bank notes, but by the end of the eighteenth century this venerable institution had become the country's *de facto* issuing bank, a function that was to be confirmed and reinforced by the 1844 Bank Charter Act. Such reinforcement was necessitated by the fact that from 1821 to 1844, banks issuing IOUs – that is notes – had wantonly proliferated; at the time of the Bank Charter Act, they numbered no less than 72.

The Banque de France was created on January 18, 1800 as a privately capitalized firm entrusted with a mission of public interest consisting in remedying the insufficiency in means of payment by issuing bills payable on sight to the bearer. That said, it was constantly confronted with the competition of other banks issuing their own bills. The Banque de France did obtain the exclusive privilege of issuing bills, but in Paris only and for a length of time limited to 15 years. In 1806, Napoleon extended this to 25 years. This gift was a poison pill, however, in so far as he imposed more than a mere modicum of governmental control. In fact, he stated that the bank "does not belong to shareholders alone, it also belongs to the state, because it endows the latter with the privilege of coining money". What a dubious privilege! It so happened that the bills remained integrally linked with the issuing bank and they could not possibly be exchanged in any alternative venue. It should also be mentioned that these bills could be refused as a means of payment. It was only after 1848 that the bank note emerged as a fully recognized means of payment. And it was not until 1860 that the issuing privilege was extended to all the national territory and that, thanks to its monopoly on money issuance, the Banque de France attained the status of a central bank. Yet, just like the Bank of England, it remained a privately capitalized firm. Only in 1945 was it nationalized, as was also the case for the Bank of England in 1946. Even today, the central bank belongs to private shareholders in

Switzerland (and Belgium). The Swiss franc is still one of the world's strongest and most seaworthy currencies.

History shows that a currency's strength results from the credit granted to the issuing party. The value of money is predicated on trust. And when the latter is fiduciary, confidence emanates from the incontrovertibly proven quality of the issuer. The etymology of this adjective traces it back to the Latin noun *fiducia*, that is abiding trust. That is to an even greater extent the case in international exchanges; currency no longer functions as the means of settlement imposed by the powers that be. In trade beyond borders, it turns into the object of bilateral barter.

Foreign exchanges

It is not necessary to insist on the indispensability of the foreign exchange market. All international commercial and financial operations take it into account. Domestic transactions on goods, services and financial assets are performed in different currencies; each country employs its own. International activity necessitates currency exchange. Nowadays we can see on the one hand the international opening up of economies and financial markets, and on the other hand the globalization of the activities of companies and financial institutions. They collectively reinforce the role of the foreign exchange market. International trade requires a market in which the supply of currencies is confronted by demand; that is basically how their prices are determined. The foreign exchange market indeed ensures that the supply of and demand for several hundred currencies are brought together and constantly discloses their local value. The size of this market is a reflection of the number of existing currencies and the volume of trade denominated in these currencies.

This was especially evident when the European single currency was at long last brought into being. From January 4, 1999, all transactions on

the 11 financial markets of the countries comprising the euro zone were denominated in euros rather than in 11 separate currencies. If a French investor wishes to purchase German public stocks, he need no longer make a preliminary acquisition of deutschmarks. What was the case for the financial markets was extended and made compulsory for firms and individuals from 2002 onwards. Large-scale transactions involving the 11 currencies of the euro zone had previously provided grist for the mill of a foreign exchange market that all of a sudden closed shop.

Since the beginning of the 1980s and following the opening up of virtually all capital markets, the international monetary and financial system devolved into a gigantic jigsaw puzzle whose pieces were connected by interest rate fluctuations and arbitration operations undertaken by a large cast of diversified economic actors. Yet well before the twentieth century, the export of capital had been an everyday reality. Just look at Florence as early as the thirteenth century and at Augsburg, Antwerp and Genoa in the sixteenth century! By the eighteenth century, capital was circulating not only in Europe but around the world:

> Coins of the value of eight "espagnoles", minted with the white metal of America, crossed the Mediterranean, traversed the Turkish Empire and Persia and went on to reach India and China. From 1572 onwards, by way of Manila, the white American metal likewise crossed the Pacific and, at journey's end, came once again to China via this new route.[8]

That said, the depth, volume and number of currencies involved in these exchanges was in no way comparable to today's. Foreign trade is accompanied by the development of currency exchanges. The great discoveries of European explorers set in motion trade in peppers, spices, silk and drugs and at the same time fostered the exchange of metal currencies:

> From the end of the fourteenth century onwards, the archives of Francesco di Marco Datini, a merchant from Prato, near Florence,

> signal the give-and-take of bills of exchange between the cities of Italy and the hotbeds of European capitalism: Barcelona, Montpellier, Avignon, Paris, London, Bruges.[9]

Immanuel Wallerstein explains that not only bronze and silver currencies but also bills of exchange made possible the settling of transactions within the European economic zone from 1600 up until 1750. Such settlements were sometimes performed through the transfer of gold on the Amsterdam marketplace; multilateral trade in bills of exchange was thereby brought to a conclusion. On the other hand, trade with Asia, the East Indies and Russia was bilaterally based and entailed goods rather than bills of exchange. The coins and precious metals exported to Asia in exchange for pepper and Indian fabrics contributed essentially to money hoarding or jewelry manufacture. This meant barter rather than finance.

Today's foreign exchange (FX) markets are anything but centralized; several hundred currencies are quoted two by two. Currency quotation is performed on a 24/7 basis over the counter and by telephone. Transactions between participants are carried out over the phone, through computers or by means of an electronic system. FX is an over-the-counter and bilateral market. That is why it is impelled by market makers who ensure its liquidity. Such two-sided organization may well be bound to change. The CLS bank (which has been under construction for several years) would be ready to serve as the central market maker for foreign exchange for 60 of the largest banks in the world. It would take a similar role to Amsterdam with regard to the other European countries in the eighteenth century. The CLS would consequently replace a chain of atavistic, barter-based exchanges with a multilateral centralized organization.

As of now banks remain the paramount operators on the exchange markets. They take charge of exchange operations on their own behalf and for their customers as well. Since the beginning of the 1990s, non-banking financial institutions have also grown into highly significant operators on the exchange markets. These institutions include the

finance and bank-related subsidiaries of the major industrial groups. Along with these branches, institutional investors and great private fortunes have likewise evolved into top-notch economic actors. Fund managers now generally invest overseas so as to "split the atom" of risk and enhance their yields.

Transactions on the foreign exchange market are performed at two levels, the wholesale and the retail markets. The former is an interbank market limited to large international banks that deal with each other and with central banks (when the latter assume a market role) either directly or through the intermediary of brokers. The banks actively intervening are relatively limited in number, 50 to 80 at the very most. These institutions play the part of dealer or market maker. They are permanently present on the market and are able at any moment to propose a buying and selling price for an impressively large number of currencies. Operating alongside these large-scale international financial institutions, banks of lesser importance are quite active but do not continually function as market makers. The second level is that of the retail market in which banks carry on transactions with their customers.

The prices of the different currencies are the result of much bilateral bartering. There are several hundred currencies in the world and the price of each of them in relation to each of the others is the result of a chain of "two-by-two" transactions. Of course, the different currencies quoted on the foreign exchange market are not all of equal importance. The dollar constitutes the currency of reference and most transactions on virtually any financial market employ it as such. It nonetheless bears mentioning that the euro to a greater extent and the yen to a lesser extent have taken on a truly international dimension. These currencies are quoted against the dollar in practically all international financial markets.

The pound sterling, Swiss franc, Canadian and Australian dollars as well as other currencies of comparable importance are negotiated on very many marketplaces but only on a more or less continuous basis. As for the other convertible currencies, they are quoted only when the issuing

financial market is open. Non-convertible currencies are not subjected to market functioning; their prices are determined by the central bank. When it comes to exchanging Polish zlotys and Turkish pounds, banks may have to trade off zlotys against euros and euros against dollars; the yen may need to be brought into play. That is why the sun never sets on the foreign exchange market; but that is also why there need be several transactions involving a chain of several currencies so that a zloty can be converted into a Turkish pound.

The initial transactions of a given day are registered in Sydney, Australia and Wellington, New Zealand. This is followed by the opening of the markets in Southeast Asia: Tokyo, Hong King, Singapore. Those of the Middle East follow suit. The markets of London, Paris, Frankfurt, Zurich and less widely renowned European centers of trade take to the task once the Asian markets have closed for the night. They are followed by those in Chicago and Toronto. And when, in their turn, the markets of Los Angeles and San Francisco call it a day, Wellington and Sydney open up yet another day of transactions. Under such conditions the market is continuous and functions non-stop, 24 hours a day. It does so successively on the various financial markets, five days out of seven. During the weekend transactions slow down; only the exchanges of the Arab world are systematically active. The interbank foreign exchange market is thus the first genuinely global or worldwide one.

That is why some economists, many of them European, are against the foreign exchange market. They see it as an ongoing illustration of the untold evils of capitalism. Price fluctuation, globalization of trade and more precisely the pronounced imbalance between the volume of transactions on the foreign exchange market and the much lower volume on the international goods market are thought to show that the exchange market is an evil nuisance that needs to be mastered.

At the turn of the millennium, these economists impelled some governments, especially those in Europe, to implement the Tobin tax as a means of regulating foreign exchange markets. Conceived at the outset of the 1970s, the taxation proposed by James Tobin (who won the 1981

Nobel Prize in economics) was meant to equip the mechanisms of currency exchange markets with a grain or two of sand. It was a matter of levying small-scale customs duties any time that capital was converted from one currency into another. Capital would be submitted to customs charges, just as drivers pay a toll when using a motorway or turnpike. It was assumed that even minimal tax rates would paralyze speculation in so far as the latter feeds on infinitesimal fluctuations. The benefits derived from this operation would contribute favorably to the World Bank.

Our economists viewed this as a question of stemming the flow of the speculative capital that was supposedly causing financial and monetary crises. If speculators' dealings were brought to an end, it was thought that currency fluctuations would diminish and monetary crises be avoided. In fact, even a small degree of taxation does have a significant impact on a speculative market; speculators do often bet on perhaps minimal price fluctuations. And yet those economists have forgotten that a transaction on the foreign exchange market involving two currencies is often the result of transactions between many other currencies. To use the same example as before, when a Turkish firm purchases Polish goods, it must sell the Turkish pounds in its possession for zlotys. But there is quite probably nobody who, at precisely the same time, needs to sell exactly the same quantity of zlotys for Turkish pounds. In order to perform this transaction, banks are compelled to purchase Turkish pounds from the firm and go on to sell them for a given quantity of euros; these will be sold for dollars; the dollars may perhaps be sold for yen; then the yen could be sold for roubles, which would be sold for the aforementioned zlotys. By levying even a token tax on each transaction, our economists render exchanges between the zloty and the Turkish pound unaffordable.

They have perhaps conveniently forgotten that the proposition formulated by James Tobin stems from a time (before 1971) when foreign exchange was fixed under the Bretton Woods agreement. His idea consisted in preserving some national monetary autonomy. Arbitrage

tends to keep interest rates on the monetary market at the same level in all the currencies of the world once risk factors are taken into account. This prevents central banks from carrying out independent monetary policies. If a slight taxation of speculative movements has a negligible effect on an isolated transaction, it amputates an annual yield by 2.5 percent if there is only one movement per week. This taxation would leave a "margin" for central bankers to intervene on their interest rates. In a fixed-rate system within the framework of the Bretton Woods agreements, each member of the IMF pegged the value of its currency to that of gold, which meant in practice that it was pegged to the dollar at a time when the latter still respected the gold standard. In this system arbitrage transactions were numerous, but the present-day floating exchange rate system renders them exponentially greater. Parities result from transactions between two currencies, amid hundreds of others; in a "floating" rate system, adjustments are multiple and manifold. That is why intercurrency transactions are of much higher volume than that of the underlying, related transactions in goods. That is also why, according to the figures issued by the IMF, 80 percent of FX transactions are reversed in a week or less.

None other than James Tobin (who died in 2002) recommended in 2001 that banks be taxed not on each distinct operation, but rather over a week to allow for these market adjustments. That would have left 80 percent of the transactions outside the Tobin Tax. For a number of years, advocates of the latter led many people to believe that it was normal for speculators to have their speculative gains subjected to taxation. Nobody ever stated that this was a tax not on gains but on movement. Nobody ever openly recognized that speculative gains were in fact taxed in most countries in any case.

Such issues give rise to strong feelings. An article in French daily *Le Monde* on October 23, 2001 commented:

> According to the organizers, from the 19th through the 21st of October there were 4,000 people assembled in the classrooms and

> amphitheaters of Berlin Tech. The police were not present and provided no figures. It is nonetheless clear that participants at the founding congress of the German branch of the Attac protest movement were quite numerous. Of French origin, the "Association for the taxation of financial transactions and for aid to citizens" is growing rapidly in Europe, publicizing the acronym and concerns that made it famous ... Less abrupt in their formulations but just as categorical, others denounced the war, asserting that the tragic events in New York and Washington corroborated their theories according to which it was the world market that fed the flames of terrorism. Each speaker denied being anti-American and proclaimed his horror of terrorism, but the long and unremitting reminders of the interventions of the US Army in many areas these past 50 years limited the scope of the affirmation and at the same time clearly assessed responsibilities: the United States and the wholesale globalization imposed by America bear exclusive responsibility for what happened there.

The ATTAC (Action for a Tobin Tax for the Assistance of Citizens) was created in France in 1998 by *Le Monde Diplomatique*, a subsidiary of the French newspaper. It would seem that the chickens had come home to roost. Once again, people were hoodwinked by a dollop of intellectual terrorism. Once again, people succumbed to the temptation to subscribe to simplistic recipes at a time when problem resolution is highly complex, necessitates a great deal of time and presupposes basic minimal humility.

Finance capital of the world?

London and New York have long been contenders for the title of the world's financial capital. In reality this prestigious title does not exist; worldwide finance is not united. While New York deals with more mergers and acquisitions, London is one of the leading centers for international

stock transactions. It also remains in first place as regards foreign exchange and specialized markets (precious metals, petroleum and so on). London had been in the lead until the early twentieth century; during the First World War, New York had risen to the forefront. After a time of decline (1920–40) that was nonetheless marked by the creation of the foreign exchange market, London recovered its financial primacy following the Second World War. In 1958 exchange controls were eased and the Eurobond market developed over the course of the 1960s. The 1979 abolition of exchange controls put the City of London in the lead, as did the 1986 deregulation of British markets (Big Bang).

London remains the most international of financial markets, including New York. It hosts more foreign banks than any other financial stronghold. As of April 2001 they numbered 481 (as opposed to 287 in the US and 92 in Japan). Quite logically the London banks register the highest percentage of cross-border bank loans (close to one-fifth of the world market).

The London Stock Exchange is the most international of them all. More than 500 companies originating in 60 different countries are quoted there. In 1999 alone, 7.5 million transactions were performed on foreign shares and represented over a third of the total number of transactions effected on the British market. That year London generated no less than 58 percent of international trading in stocks.

London also brings together the greatest number of large firms in Europe; 65 percent of the most important companies are represented there; one-third of them have their headquarters in the British capital (as opposed to 9 percent in Paris and 3 percent in Frankfurt).

The UK is the premier international insurance market. Asset management is likewise characterized by the presence of foreign portfolios; a quarter of the administered funds are the property of European or overseas customers or institutions. The June 2000 ranking of the financial consultancy firm Thomson Financial Investor Relations showed that with $2,500 billion of assets under management, London remains the number one market in the world.

London also represents the worldwide foreign exchange capital where about a third of currency transactions are carried out; in and of itself, this result represents more than the total amounts registered in New York and Tokyo on the same market.

Is London the finance capital of the world? Notwithstanding the ongoing internationalization of exchanges and the movement towards globalization, stock markets still remain anchored in their country of origin. Each stock market is overseen by one or more national authority within the framework of the national law; infractions are sanctioned by country-based tribunals. It is quite difficult to imagine the internationalization of such exchanges if applicable laws do not equally cross borders. It took a state to render orderly the exchanges of long ago; nowadays it would take at least an agreement between states to promote a global stock exchange. If not, the national regulator would just submit transactions to its own rules.

Let's take the example of the United States. The Securities and Exchange Commission (SEC), the main regulator of the American markets, decided in the 1990s that a foreign stock exchange wishing to provide access to its market from the US (via computers installed on American soil) had to comply with the rules laid down by the SEC. Such a demand presupposed that all firms with stocks quoted on this exchange would be subject to the disclosure rules of the SEC. The upshot? No non-American stock exchanges are able to conduct business in America, at least not until the SEC shows more flexibility. The single exception is the DTB, Germany's futures exchange. The DTB is regulated not by the SEC but rather by another regulatory agency, the Commodities Futures Trading Commission (CFTC). This is the case because the DTB quotes prices not on shares but on derivatives. And these contracts depend on the CFTC, not on the SEC. Yet it happens that transactions on index options are under the control of the SEC; they cannot be put up for sale by the DTB. How can an American investor buy (or sell) shares belonging to German firms? He has got to call his broker in New York, the broker calls a colleague in London, who goes on to transmit the order to a

German broker, who winds up putting it on the market. So many intermediaries entail manifold complications.

That is why regulators in a large number of European countries have been working for over 20 years with legislators to harmonize their sundry and diverse rules and regulations. In Europe, the 1996 Banking Directive (DSI) is undergoing serious revision. If each regulator located in the 16 European countries harmonizes the current regulations, it is possible that throughout Europe intermediaries will soon be applying principles from the same rule book. Rather unfortunately, experience goes to show that this will take some time. The rule adopted in Europe allowing for a measure of integration is basically that of the single passport. It gives a financial intermediary under the supervision of a "home regulator" the right to operate throughout Europe. He (or she) is monitored by the latter and at the same time has got to respect the rules of the country in which he carries out his transactions. The regulatory host and the home regulator recognize each other's competency in their respective fields of intervention. This is all rather complicated, but it works. As of now, the one truly cross-border regulated market in the world is European: Euronext, a market covering France, Belgium, the Netherlands, Portugal and Scandinavia.

It is obvious that the power of a state, with its rules and regulations, confronts market globalization with a stumbling block. This is the case even in an area such as Europe that is fully committed to integration. The supremacy of markets over governments is a shibboleth; it has been vocally contested in many places. It has precious little to do with everyday economic reality.

4

The future is the field of play

> Risk and time are opposite sides of the same coin, for if there were no tomorrow there would be no risk. Time transforms risk, and the nature of risk is shaped by the time horizon: the future is the playing field.[1]

The concept of capital is inextricably linked with the idea of time. For eighteenth-century French economist and politician Turgot, capital was an advance that tides the producer over the interval of waiting until his own product is ready to use. By that he meant working capital. His contemporary, English economist David Ricardo, conceived of time as one of the costs of production.

Worldwide assets in relation to revenues have never previously been as great as is the case today; the share of financial capital has never been quite so sizable. In fact we are living in a capital economy. This finds itself subjected to the effects of competition, deregulation and liberalization. These factors allow for enhanced efficiency and overall progress, but also entail more pressure as regards time and profitability.

In Amsterdam in 1680, only two stocks and a few government bonds were quoted. Nowadays there are tens of thousands throughout the world and quite as many fixed-income securities. If savers had limited their investments to a few stocks, they would not have been in a position to diversify their risks. Stock market investment would have remained as reckless a gamble as that described by de la Vega in his *Confusion de*

Confusiones. The ability to take and manage risks and to make choices concerning the future has enabled the economy of modern times to develop.

The study of risks draws on the statistical analysis initiated by European mathematicians in the 1650s, most notably the Frenchmen Blaise Pascal and Pierre de Fermat. Following several breakthroughs superbly recounted by Peter Bernstein,[2] in 1952 Harry Markowitz developed the modern portfolio theory, whose functioning consists in using statistics so as to compose portfolios presenting the least possible risk. His efforts earned him a Nobel Prize in Economic Science in 1990. He forthrightly recognizes the fact that he was far from the first to insist on the merits of diversification. Don Quixote originated the adage that you should not keep all your eggs in one basket; Shakespeare begins *The Merchant of Venice* with a story about risk diversification in maritime commerce. But it was Markowitz who established the fundamentals of the statistical methodology allowing for the reduction of uncertainty. It was already understood that risk goes down by dint of the diversification of several securities within a portfolio. Thanks to Markowitz, the very notion of risk was perceived differently.

Risk is the likelihood that an investor does *not* obtain the hoped-for profitability. If profitability is a random variable (and it is), if it follows a normal distribution (and it looks close to it), then risk may be measured in terms of standard deviation. Standard deviation measures dispersion around the mean – one may also speak of surprises belying the usual expectations. It measures the confidence with which we make a forecast. Keynes wrote:

> the state of long-term expectation, upon which our decisions are based, does not solely depend, therefore, on the most probable forecast we can make. It also depends on the confidence with which we make this forecast – on how highly we rate the likelihood of our best forecast turning out quite wrong. If we expect large changes but are very uncertain as to what precise form

> these changes will take, then our confidence will be weak. The state of confidence, as they term it, is a matter to which practical men always pay the closest and most anxious attention. But economists have not analyzed it carefully and have been content, as a rule, to discuss it in general terms.[3]

Well, now they have.

As time goes by

Elapsed time justifies the difference between present and future value. Tomorrow's certain flow has got to be discounted to the present. Future revenue is of less value today than the same amount of money received tomorrow. Time is indeed money. Real-time valorization had never previously played such a lead role in economic functioning. The market values short-term changes and discounts to present value the anticipation of impending changes. Such an economy is more feverish, more volatile than the flows it converts to current value.

The profitability of a security depends necessarily on events that have yet to take place. Stock quotations hinge on quarterly results, which obviously depend on chance. Bond values are contingent on the ups and downs of interest rates. A financial investment is a wager based on the ability to foresee, that is to forecast. Financiers and meteorologists run the same risk of making a perhaps costly mistake.

Time enriches

Elapsed time lets capital multiply by means of ongoing capitalization. We are generally not aware of the power of compound interest. This is a means of calculation whereby interests (and more generally speaking gains amassed during a period of time) are reinvested so as to generate interest added to that of the following period, and so on. It has been

determined that the Indian who sold Manhattan to the Dutch for $24 would be worth $50 billion today, had he been in a position to invest his 24 greenbacks at a 6 percent half-yearly compound interest rate.[4] Having inherited such a fortune, his heirs would be able to buy back part of the island (skyscrapers included)!

Over the course of the 1990s, the press and many European intellectuals had the habit of castigating the dictatorship of the markets, the avidity of stockholders, the "financializing" of the strategies of firms aiming at a 15 percent yield. Perhaps ceding to media pressure, some CEOs were prone to announce growth targets of 15 percent for their sales, results and profitability. Enterprises seemed to believe in the magic figure of 15 percent at a time when even a thriving economy was growing by at most 3 percent. How can we explain this sleight of hand?

The figure of 15 percent is explained by the power of compound interest. Let's take a refresher course in basic math. A given sum of money placed at 3 percent and reinvested year after year will double in value within 24 years. At 15 percent, such an accrual necessitates fewer than five years! A rule of thumb enabling John Doe and Jack Straw to reckon the time it takes for the principal to double consists in dividing the number 72 by the prescribed interest rate; when it is set at 3 percent, the invested amount grows twice as big in $72/3 = 24$ years. At 15 percent, it doubles in fewer than five years (72/15). It will have doubled again five years later and thereby quadrupled in not quite a decade. Within 15 years the quadrupling will have once again been multiplied by two and the investment multiplied by eight. After 20 years? By 16! At the age of 25? By 32 (32.92, to be exact). Over 25 years, the initial investment is multiplied by 32 at a 15 percent rate of return; at a 3 percent rate, it merely doubles. The first progression rate is sixteen times higher than the second, while the return is just five times greater. That said, in economies that grow – barring temporary exceptions – by 2–3 percent a year, aiming for 15 percent growth or profitability can only occur through the sacrifice of forces such as employment and production

capacity. If some firms can grow at a 15 percent rate, others must experience reductions of a nearly similar magnitude so that taken as a whole they expand by 2–3 percent.

So what is the real, viable growth rate for a company? Chris Zook and James Allen, both from Bain and Company (an American group providing strategic advice), conducted an in-depth study of western enterprises during the decade 1988–98.[5] They first examined 1,840 companies among the largest of the G7 countries (at least $5,500 million of sales in 2000) and found that only 497, that is 27 percent, had managed to sustain a mean growth rate higher than 5.5 percent per year (exclusive of inflation). Only 304 companies (16 percent) registered mean growth not just in sales but in earnings per share exceeding 5.5 percent a year. This winnowing out is even more pronounced as regards shareholder enrichment; only 240 companies (13 percent of those studied) indeed delivered value to the latter, that is mean yearly profitability (capital gains and dividends combined) greater than the profitability rate required by investors. In other words, over a 10-year period only the shareholders of these firms have been rewarded for the financial risks they incurred, and naturally at a level most often markedly lower than 15 percent a year. And yet, 90 percent of these companies had had much higher targets.

Unwitting comic relief is provided by the fact that professional investors were altogether aware of this. In 1999, Merrill Lynch carried out a survey involving 66 funds in continental Europe managing a combined €1,735 billion. The aim was to discover how these managers valued the enterprises in which they invested. Their projection of long-term profitability for European stocks was 7.6 percent (excluding inflation). None of this is excessive; in any case, such a rate of return is totally compatible with hypothesized long-term growth. The 15 percent figure is indisputably a myth.

For a rational investor, asset valuation should be based only on the present-day value of the most reliable projections of future cash flows that the investor believes will be generated by the asset (adjusted for

risk). *Per se*, capital investment is a long-term decision based on long-term goals and the most accurate possible projections. Theoretically, the value of a financial instrument is calculated through discounting of the future cash flows that it will yield, at the profitability rate required by the investor. Prospective cash flows hinge on the future state of the world, and the required rate of return is a reflection of the investor's appreciation of the time passing and the risk of *not* attaining the desired profitability. Therefore this rate translates both the price of time and that of the risks incurred by the investor.

The difficulty when connecting reality to theory resides in the definition of the *horizon* for expectations and/or projections. The horizon – or forecasting range – is the period of time over which the investor formulates the prediction, the expected return. An investment horizon is predicated on trust. The market speculates on the future: it is generally accepted today that market prices reflect a forecast period of between 10 and 15 years. The problem is how one can in reality have confidence in a 10–15-year forecast.

There is more. *Holding tenure* is the period separating the purchase and the resale of a security. As a general rule, holding tenure is not congruent with the horizon; resale takes place before or after the forecasting range one had in mind at the time of purchase. And it is a constant that neither horizons nor holding tenures correspond to theoretical lapses of time. Theory calculates an annual rate of return. Investors playing the stock market in order to provide a nest egg for their retirement have a forecasting range of several years (most often 10–20). In practice investors, especially professional investors, are judged on the basis of their *monthly* performance. This is assessed in relation to the closing daily stock market quotes on the final working day of the month. At times they are even evaluated in terms of *daily* averages! Since the benchmark is the *current* stock market price and since their performance is "marked to market", it is in their interest to sell rather than wait and see. This is most particularly the case for day traders, individuals who frenetically buy and sell in the hope of beating

the market at its own game. Yet generally speaking, long-term investors end up ahead of the pack.

Suppose that Joe Six-Pack had in 1969 entrusted the S&P 500 stock index fund with 10,000 of his hard-earned dollars. By mid-1998 this man on the street's investment would have been worth $310,000. It would have multiplied 31 times in 30 years.[6] Over the course of two centuries the profitability of stock market investment in the US has averaged 7 percent a year, that is it doubled every 10 years, whereas US GNP has doubled only once every 23 years. In 23 years, shares are inclined to *quadruple*!

In 1994 Jeremy Siegel, professor of finance at the Wharton School of the University of Pennsylvania, published a study of nearly 200 years of price evolution on the US stock market.[7] Over 200 years and removing inflation so that purchasing power is taken into account, an American investor holding shares for 17 or more years has *never* lost money – not even following the Great Crash of 1929. But between September 23, 1929, when it reached 381.17, and July 8, 1932, by which time it had fallen to 41.22, the Dow Jones had lost nearly 89 percent of its value in fewer than three years. Admittedly, Wall Street did not recover its 1929 level (at constant currency) until the mid-1950s. Yet an investor who had invested in stocks at the height of the bull market in 1929 would have recovered his investment in 15 years through revenues in dividends and capital gains (in real terms, i.e. taking out inflation).[8] The one 15-year period during which an investment in US stocks has not shown real profitability is that preceding the end-of-the-twentieth-century bull market, between 1966 and 1981, a period during which US stocks lost nearly 0.5 percent of their purchasing power annually.

If stocks are kept for 10 years, they will always be more profitable than bonds; the former are shielded from inflation, the latter are not. Whichever five-year period is chosen from 1802 onwards, the most unprofitable stock investment over that course of time has been −11 percent per year, a figure that is hardly worse than that of bonds (−10 percent). Every 20-year stock investment has always been profitable.

With 1 percent of real annual profitability at the worst, a 20-year stock investment always beats inflation.

What is paradoxical is that even if this reasoning holds for a 10-year period, the same is not the case for just one year. Held for that length of time, stocks beat Treasury bonds in just two out of five cases, a situation that is difficult psychologically. If you are 40 and want to prepare yourself for retirement, stocks represent an excellent choice. But if you want to put some money aside to buy a house next year, it is obvious that you should not invest in stocks; nothing beats a risk-free 3 percent offered by a savings bank. The short-term risk facing an inadequately diversified portfolio is quite substantial. This is the paradox that leads many if not most people to abominate the stock market and deem it no more than a casino. Nevertheless on a long-term basis for a well-diversified portfolio, such criticism utterly fails to hold water. In fact, at this level of profitability, this represents the best possible investment. Think back to Barnum and Bailey. If you are so inclined you can hoodwink the whole world for a while and a given individual all of the time, but you cannot hoodwink the whole world all of the time. You can delude yourself for a while with a diversified portfolio, you can delude yourself all of the time with a limited number of stocks, but you cannot delude yourself in the long run with a diversified stock portfolio.

Shareholder return in the US from 1871 through 1996 averaged 6.8 percent a year. This rate is a geometric mean of annual profits, dividends and capital gains (or losses). It is a rate of real return, at constant purchasing power, that is with inflation deducted. Siegel distinguishes two sub-periods: 1871–1945 (the rate approximated 6.57 percent) and 1946–96 (it reached 7.13 percent). Notwithstanding the many forms of economic as well as social and political upheaval encountered in the past two centuries by the US, American shares have returned between 6.5 and 7 percent at constant purchasing power throughout this great length of time. But then again, this is a long-term average for totally diversified portfolios.

According to some observers the US remains distinctively isolated. That said, Professor Siegel's study of the profitability of stocks in the UK, Germany and Japan confirms the superiority of stock market performance in these countries. Annual returns for a stock investment in the UK (6.3 percent), Germany (7.1 percent) and the US (6.9 percent) coexist within a 1 percent bandwidth. The return on Japanese stocks may be lower at 4.8 percent per year, but it is higher than that on any other long-term investment in Japan. Siegel goes on to conclude that the capacity of the stock markets of developed countries to recover from wars as well as aggravated inflation and recession is altogether remarkable. The superiority of investment in a diversified stock portfolio is a truly worldwide phenomenon.

A study published at the beginning of 2002 by London Business School professors in collaboration with ABN AMRP confirms Siegel's analysis in relation to the 12 main financial markets of the world. This study has been developed into a book and we will return to it in Chapter 9. Taking the twentieth century as a whole, average stock return has been tabulated at about 5.5 percent, as compared with only 1.5 percent for bonds. In four of these countries (Germany, Japan, France and Italy), bonds have in fact put the investor at risk of an annual loss in the region of 1.5 percent! These countries have shared sobering experiences: runaway inflation at certain times in the century and the massive destruction of their basic means of production during the two world wars. They also show rather poor returns on stocks that are nonetheless far more profitable than bonds. War has long-term repercussions.

Time and expectations

Total shareholder return (TSR) or profitability can be calculated by dividing the difference between payments received and the initial capital outlay by the latter. Payments received minus the initial outlay are composed of two parts: payments received for each period and the capital gains (or losses) at the conclusion of the period concerned.

How can we explain the real profitability of a stock investment? The mean return on American stocks for a lengthy period is rather easily expressed in terms of mean earnings yield. Earnings yield represents earnings per share divided by the price of the stock. The average earnings yield from 1871 through 1945 was 7.35 percent on a mean return of 6.57 percent. In the 1946–96 half-century, mean earnings yield (6.46 percent) was comparable to returns (7.13 percent). From 1871 through 1996, mean earnings yield for the US market was 7.3 percent, that is 0.4 percent below real shareholder return. It seems to be a historical fact that profitability for stockholders tends to approximate to earnings yield.

There is a common parameter helping to determine these two percentages, TSR and earnings yield: the annual dividend divided by price, that is the stock dividend yield. When calculating TSR, you add to this return the capital gains (or losses) over one year. As for mean earnings yield, it is the part of profits set aside that is added to dividends in the calculation of earnings per share. Investment of these retained earnings serves to finance company growth; the latter should serve to heighten stock prices and therefore TSR. It also bears mentioning that when earnings yield remains stable for a sizable length of time, the growth of earnings per share is mirrored by the growth of quoted prices.

Earnings yield is by definition the converse of the price/earnings ratio. Also known as the capitalization multiple, the *price/earnings ratio* (p/e or PER) expresses the relationship between stock quotes and earnings per share. If price growth were not accompanied by earnings per share, the p/e would not be stable, yet over the long haul it is. One may consequently expect return on a stock investment to be equal to dividend yield (mean average dividend divided by the quoted prices) plus the growth rate of earnings per share. From 1871 through 1945, real shareholder return (6.57 percent) was close to 1 percent greater than the sum total (5.88 percent) of dividend yield (5.16 percent) and real growth of earnings per share (0.72 percent). And over the following half-century (1946–96), shareholder return (7.13 percent) was just 0.13 percent

higher than the sum total (7.00 percent) of mean dividend yield (3.75 percent) and real growth of earnings per share (3.25 percent). Over the last century as much as three or four percentage points of total investment return on US or UK equities came through dividends.

Siegel's figures seem to show that over a long period of time, total shareholder return is roughly equivalent not only to earnings yield but also to the sum total of dividend yield and inflation-adjusted earnings growth. When endeavoring to establish the long-term TSR, an expectation on which a rational investor's decision ought to be based, a basic ingredient should now appear to be all but axiomatic: one must accurately estimate the real, inflation-adjusted growth of income and profits. That is why economic growth forecasts are of such importance to would-be investors; that is why projections of company growth are analyzed in such painstaking detail. Unfortunately, economists are not often the most talented of forecasters. As for the companies' predictions, in numerous cases the real results bear little relationship to forecasts.

An additional difficulty stems from the fact that companies' growth rates are heterogeneous; the upward paths they take are highly divergent, to say the least. Zook and Allen have convincingly shown that in a 10-year period (1988–98):

> Only about one company in eight, or 13 percent, achieved sustained and profitable growth (or could be classified as a sustained value creator) over a decade that many would rank as among the best for the world economy. In contrast, our internal sample of targets from strategic plans showed that more than 90 percent of the companies examined had aimed at returns well in excess of these levels. When we tightened the criteria a bit more, requiring 8 percent real growth (about 11 to 12 percent nominal currency growth in most of our major countries in this period), the percentage of sustained value creators declined to only 9 percent.[9]

That is water under the bridge, nevertheless. How can one forecast TSR? Today many companies pay no dividends at all. In 2001, the

average dividend yield on Wall Street's S&P Index was just 1.2 percent. And what is one to think about growth prospects? Merrill Lynch's survey of November 2001 showed that fund managers expected an average of no more than 4 percent earnings per share growth over the following year, while stockbrokers' analysts were still clinging to the hope that the figure would reach 15 percent! At the end of 2001 the expected TSR should have been 5.2 percent (4 + 1.2) for the fund managers surveyed by Merrill. To find higher returns, they had to be able to identify sustained value creators and to think beyond the following year.

Zook and Allen's thesis is that the foundation of sustained, profitable growth is a clear definition of a company's core business. What matters is to seek out companies corresponding to these criteria. Predictions are based in this case on a qualitative methodology. The alternative solution consists in calculating mathematical expectations of growth rates.

A prediction can be expressed in terms of anticipations or by mathematical expectancy, that is either by expectation of what is to come or by mathematically expected value. The two are by no means equivalent. Mathematical expectancy is not at all the mathematics of expectation. And just like expected value is not necessarily the value expected by an investor, mathematical expectancy is not necessarily an expectation of what is going to happen. In fact the mathematical expectancy of a random variable is the sum total of the values that the variable may take, multiplied by the probability that this value will indeed be brought into being.

Let's give an example. Suppose that you have a claim on a company teetering towards bankruptcy. If this company recovers, your loan will provide you with a yield of 20 percent. If it goes bankrupt, your loss will be total. Your expectation is that the company will survive and that you will earn 20 percent on your loan. If the probability that the company go bankrupt is 20 percent, there is by definition one chance out of five that it indeed does so. As for the mathematically expected value, it is: $(20\% \times 0) + (80\% \times 20\%) = 16\%$. The latter is not at all a form of

anticipation. In no case will you obtain 16 percent, but rather either 20 percent or 0.

Mathematical expectancy is an average of possible rates of return weighted by the probability that it actually obtains these values. Mathematical expectancy for a coin toss – heads = €1; tails = 0 – is €0.5. This necessarily differs from anticipation in so far as the latter may be €1 or 0, but *never* €0.5. The prediction of the outcome of this game is on average 0.5; that is the mathematical expectancy. Therefore anticipated returns necessarily differ from their arithmetically weighted average. Predictors of the former may or may not draw inspiration from the latter, but they are different.

Mathematical expectancy is the average figure towards which your returns converge, provided that you undertake the (empirical) experiment many times. Each time the results (or observations) will to some extent *diverge* from this mathematical expectancy. Through definition of the average, the sum total of deviations from the mean is nil, the negative deviations canceling out the positive ones. If we want a measure of dispersion or scatter based on deviations from the mean, we must calculate variance, which is defined as the sum total of the squared deviation between observations and their mathematical expectancy. This is a squared result that does not behave in a linear manner but follows a second-degree equation (which is not highly practical when performing calculations). To express dispersion from the mean in the same units as the latter, we usually employ as a measure of risk the square root of variance; this is known as the standard deviation. The standard deviation measures the probability that a random variable will have a certain value. If the variability follows a law of normal (or Gaussian) probability – as is the case in a game of dice – there exists a 68 percent likelihood that the observation remains within a bandwidth of two standard deviations (one standard deviation from each side of mathematical expectancy), a 95 percent likelihood of a bandwidth of four standard deviations (two on each side) and a 99 percent likelihood of a bandwidth containing six standard deviations (three on each side). A security whose actual returns

do not greatly differ from expected returns presents little risk. As for an instrument whose returns are highly volatile – some years may yield sizable losses – it is risky (if not downright hazardous).

A roll of the dice shall never abolish randomness

Probability theory, elaborated over five centuries, is anchored in games of chance. As the French poet Stéphane Mallarmé so eloquently put it: "A roll of the dice shall never abolish randomness."[10] And André Gide opined: "Human actions are less decisive than chancy."[11]

In an article for the *Washington Post*, Rick Weiss recounts the following anecdote:

> In the film *The World According to Garp*, Robin Williams is looking at a house when, like a bolt out of the blue, a small plane veers out of control and crashes into the building. "We'll take the house," says Williams to the dumbstruck real estate agent. He goes on to reassure his wife: "Honey, the odds on another plane hitting this house are astronomical. It's been pre-disastered. We'll be safe here."

Weiss respectfully begs to differ:

> For better or for worse, however, most human brains are hard-wired very differently from Garp's. If anything, we tend to exaggerate the odds that unlikely events will happen again.[12]

The odds on an outcome consist in the ratio of favorable to unfavorable, happy to unhappy ends. They matter at the time when you are placing a bet. Odds hinge on probability, which is the ratio of favorable outcomes to the total opportunity set.

Initially probability was intimately tied to knowledge. This noun is derived from the Old French adjective *probable*, which in turn goes back to the Latin *probabilis*. At first it meant "provable"; only later did it come to signify "likely", characterized by verisimilitude.

The great French philosopher and mathematician Blaise Pascal was the first thinker to calculate the probability of a player's winning a game of dice throwing. He also invented the first calculating machine, an ancestor of today's computer. It is perhaps not by chance that the French noun *hasard* (which denotes not so much "danger" as a random happening, accidental occurrence, chance meeting or stroke of luck) is derived from the Arabic *al zahr* (dice to throw; roll of the dice). As early as 1662, a treatise was published by the Port-Royal Monastery under the probable supervision of Antoine Arnauld, a prominent theologian inspired by Pascal. It was entitled "La logique, ou l'art de penser" (logic, or the art of thinking). For the first time we are introduced to the observation that we exaggerate the odds that unlikely events will happen again: "The probability of being struck by lightning is tiny, but many people are excessively terrified when they hear thunder." And as Peter Bernstein helpfully points out, Arnauld goes on to recommend: "Fear of harm ought to be comparable not merely to the gravity of the harm, but also to the probability of the event."[13]

When making a decision we must take into account not only the fear of or craving for a particular outcome, but also the probability of its actually occurring. Then again, how can we fairly assess the odds for or against a possible future event? *Sampling* is surely an essential ingredient. This is in any event at the root of *statistics*. The Latin word *status* ("way of being") devolved into both "static" (derived from the Greek *statos*, "standing still") and "state" (a term originating in the Middle Ages, when *status* was employed as a means of designating the way of being in public – state – affairs). *Status* also yielded "statistic", that is the use of quantitative data by the state.

The first person to establish tried-and-true statistics was the Englishman John Graunt, who undertook a compilation of births and deaths in London from 1604 to 1661.[14] Bernstein opines: "It was time to stand up and look around. John Graunt did, and began counting." A hundred years later, Diderot's *Encyclopédie* renders homage to him

under the title of "political arithmetic", which is defined with savor as follows:

> It is the aim of these operations to do useful research on the art of governing peoples ... But often the ministers (I abstain from speaking without making exceptions) do not believe they need to go through combinations and sequences of arithmetical operations: several imagine themselves endowed with great natural genius that dispenses them from such a slow and painstaking approach, not to mention that the nature of business seldom allows for and requires mathematical accuracy.

And the *Encyclopédie* goes on to indicate:

> Major Grant [*sic*], in his observations of *listes mortuaires*, counts ... that out of 100 infants born, only 36 reach the age of 6; ...and that out of 100, only one remains alive after 76 years.[15]

According to Bernstein, it was Edmund Halley, the renowned English astronomer who discovered the clockwork regularity of the comet that bears his name, who in 1693, 30 years after Graunt, used statistical endeavors in the establishment of probability:

> Halley's entire analysis embodies the concept of probability and ultimately moves into risk management. Halley demonstrates that his table "shews the odds" that a "Party" of any given age "does not die in a Year"... The next level of Halley's analysis was the most important of all. The table could be used to reckon the price of insuring life at different ages.

Bernstein nonetheless adds:

> After the publication of Halley's life tables in *Transactions* in 1693, a century would pass before governments and insurance companies would take probability-based life expectancies into account.[16]

Let us return to the likelihood, according to Arnauld's Port-Royal logic, of being struck by lightning, of having one's house destroyed by an airplane as in *The World According to Garp* or of losing one's life in a terrorist attack (following September 11, 2001, many people refused to fly). The Port-Royal logic excoriated those who are frightened by the slightest thunderstorm or overestimate the infinitesimal probability of electrocution from lightning. After all, one aspect of the all-too-human penchant for seeing what is barely there is a predilection to *overestimate* risk. We are hard-wired to fear first and think second. Sensation – if not panic – precedes rational analysis. How can this be explained in economic terms?

In 1731, the Swiss mathematician Daniel Benoulli presented a paper to the Academy of Sciences in St. Petersburg entitled: "Exposition of a new theory on the measurement of risk". He opposed "expected value" (price) to "expected utility" (satisfaction) and also stated:

> People with a phobia of being hit place such a heavy weight on the consequences of the outcome that they tremble even though they know the odds of being hit are tiny.

Peter Bernstein agrees and comments:

> Gut rules the measurement ... And that's a good thing. If everyone valued every risk in precisely the same way, many risky opportunities would be passed up. Venturesome people place high utility on the small probability of huge gains and low utility on the larger probability of loss. Others place little utility on the probability of gain because their paramount goal is to preserve their capital.[17]

In England in 1718, the French mathematician Abraham de Moivre had published a book dedicated to Isaac Newton entitled *The Doctrine of Chances*. He defined risk in terms of hazard, danger, peril:

> The Risk of losing any sum is the reverse of Expectation; and the true measure of it is, the product of the Sum adventured multiplied by the Probability of the Loss.[18]

But more precisely, de Moivre demonstrated the way in which a sample set of facts are representative of the reality from which they have been extracted. He showed how black and white pebbles drawn at random from a jar "would distribute themselves around the grand average". Most observations are close to the latter. As for the remainder, they "descend steeply at first ... exhibiting a flatter downward slope at each end". De Moivre's distribution is a normal curve, which we have come to term a *bell curve* because of its shape. De Moivre invented a statistical measure of its dispersion around the mean, now known as the standard deviation.

Following that it was a reclusive German mathematician, Carl Friedrich Gauss (1779–1855), who explored the realm of probability and gave it a name (his own). Another distinguished French mathematician, Marquis Pierre Simon de Laplace (1749–1827), a one-time supporter of Napoleon, went on in 1812 to put forward his *central limit theorem*. Just like Halley ("Mr. 76 Years"), he was mathematically inclined and dedicated his energies to astronomy.

Thanks to Laplace and his highly precise studies of lunar and solar gravitation, we can as of now devise a schedule for the tides; the Navy, bathers and seashell gatherers should likewise be grateful. More practically speaking in today's order of priorities, Laplace persuasively showed that a mean of random variables following any law of probability tends to follow a normal (or Gaussian) law of distribution if the number of variables is quite high and is directed towards infinity.[19]

This extends the reach of one of de Moivre's key results. If you roll or throw a die once, it will fall on one of its six sides. The likelihood of obtaining a given number is one in six, and it is the same for each side. If you make six throws, the average score corresponds to a law of probability that is not normal (or Gaussian). If you do the experiment 1,000 times and establish the frequency of the averages for the six throws, it will follow a normal law with an average of 3.5 (the average of the six sides of the die – 1 + 2 + 3 + 4 + 5 + 6 – divided by 6) and a standard deviation of 0.044. Laplace also determined the number of

observations needed to determine an average in accordance with the normal distribution.

More particularly, Laplace strove to estimate the minimum number of inhabitants who had to be polled and questioned about the number of children in their family in order to extrapolate for the population as a whole. He had previously elaborated a "method of research on the probability of constant causes through (study of) already observed events". He tried to determine the number of inhabitants to be polled so that one could claim that "the odds are a thousand to one that the total population of France shall not deviate by more than 500,000 souls from (its) birthrate-based evaluation". Using a technique comparable to the central limit theorem, he indicated the "critical mass" of a quantitatively adequate sample. No fewer than 750,000 inhabitants had to be polled in order to reach a valid figure within a narrow percentile range. Laplace was one of the first thinkers to try to provide a mathematics-based justification of the estimates to which today's polling agencies have inured us.

The essential problem when using probabilities in decision making is the following. You cannot reason in terms of probability as if you are making a choice tantamount to that put forward in a game of chance, that is a decision that may be taken several times (as is the case when throwing dice or making a coin toss). In the 1980s, French hospitals refused to undertake clinical investigations of pregnant women under the age of 38. Statistical tests had shown that they had virtually no chance of giving birth to a Down's child. Since the likelihood of this was 10 times greater in late pregnancies, clinical tests were limited to women over 38. This was a rational decision-making rule for institutions frequented year in and year out by hundreds of thousands of mostly healthy pregnant women, but it is not a rule to which the latter may adhere. A woman has just one chance to give birth to a normal child; in her case it's "all or nothing". At the end of the century, French tribunals recognized the liability of medicine in relation to the Down's children it had allowed to be born and concerning mothers who had been left in a

state of uncertainty. The great English economist John Maynard Keynes expressed himself as follows:

> By "uncertain" knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense to uncertainty ... The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence ... About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know.[20]

In financial affairs, in contrast, we come up with situations akin to a game of luck that are not subject to this kind of uncertainty. Not only may decisions be made again and again as in a game of roulette, it also happens that many may be made simultaneously, as when one invests in a large number of stocks. In these cases there is no uncertain knowledge in Keynes's sense. However, there are also situations in which one simply cannot calculate any probability whatsoever, like forecasting the future price of a single stock; in that case we simply do not know.

How normal is it for stock prices to fluctuate?

> How well does any particular average describe normal? How stable, how powerful is an average as an indicator of behavior? When observations wander away from the averages of the past, how likely are they to regress to that average in the future? And if they do regress, do they stop at the average or overshoot it?[21]

It was yet another Frenchman, Louis Bachelier, who was the first to suggest that stock exchange prices might follow a normal distribution. That said, his 1900 doctoral thesis had little impact. It was not until nearly 60 years later that Martin J. Osborne, a physicist working at the

Naval Research Laboratory in Washington, put forward the idea of representing the evolution of market prices by means of a distribution of normal probability. He had developed this thesis before becoming acquainted with Bachelier's work, but once he had done so, he wrote:

> I believe the pioneer work on randomness in economic time series, and yet most modern in viewpoint, is that of Bachelier also described in less mathematical detail in reference. As reference is rather inaccessible (it is available in the Library of Congress rare book room), it might be well to summarize here. In it Bachelier proceeds, by quite elegant mathematical methods, directly from the assumption that the expected gain (in francs) at any instant on the Bourse is zero, to a normal distribution of price changes, with dispersion increasing as the square root of the time, in accordance with the Fourier equation of heat diffusion. The theory is applied to speculation on *rente*, an interest-bearing obligation which appeared to be the principal vehicle of speculation at the time, but no attempt was made to analyze the variation of prices into components except for the market discounting of future coupons, or interest payments. The theory was fitted to observations on *rente* for the years 1894–98. There is a considerable quantitative discussion of the expectations from the use of options (puts and calls). He also remarked that the theory was equally applicable to other types of speculation, in stock, commodities, and merchandise. To him is due credit for major priority on this problem.[22]

Bachelier indeed demonstrated that price changes are randomly distributed. That said, if random distribution works reasonably well for the average return on a portfolio, it does not work nearly so well for the return on one asset (or even just one type of asset). If it is true that the price of a share does not follow the law of normal distribution, the average prices represented by a stock market index are, by contrast, described rather adequately by the law of normal distribution.

Bloomberg, the financial services firm, presents a bar graph of monthly performances of equity indexes on most stock markets over a 10-year period. Analysis shows that on the main markets, the 120 monthly variations of the index rather faithfully obey the Gaussian law of probability. Bloomberg even provides the bell curve corresponding to the average and to standard deviation.

For example, over the final 10 years of the twentieth century (1989–99), the Paris Bourse rose by an average of 0.85 percent a month, with a standard deviation of 5.75 percent. If the prices indeed follow a normal distribution, it means that in 68 percent of the cases, the monthly variation was neither lower than −4.9 percent nor higher than + 6.6 percent. Since 68 percent represents approximately two-thirds, this means that in two out of every three months, price variations neither go up by over 6.6 percent nor go down by more than 4.9 percent. Over two-thirds of the observations are to be found in a range from −4.9 percent to +6.6 percent. One month out of six, prices drop by more than 4.9 percent. One month out of six, prices soar at a rate of over 6.6 percent.

Very similar results appear on other major stock markets. Bernstein analyzes the evolution of Standard and Poor's index of 500 US stocks for January 1926 through December 1995, that is to say 840 observations of monthly price changes.[23] The average monthly variation in New York over 70 years was + 0.6 percent compared with + 0.85 percent in Paris, but over only 10 years. Standard deviation in New York was 5.8 percent compared with 5.75 percent in Paris. You will agree that the difference is minuscule. In New York two-thirds of the 840 monthly price fluctuations observed ranged from −5.2 percent to +6.4 percent. In Paris, two-thirds of the 120 observations went from −4.9 percent to +6.6 percent. The very different stock markets studied over a protracted period turn out to be closely related.

On both markets, prices behaved as though obeying a normal law. This is likewise the case for the indexes of highly liquid stock markets, for the Dow Jones Industrial Average or Standard and Poor's in the US, the Stoxx, Euronext and FTSE indexes in Europe. This is highly understandable. On an

efficient market, prices reflect the available information. And yet the latest news concerning a firm is often unforeseen (strike, accident, merger, technological breakthrough and so on). These events hinge on chance. Influenced by such news, prices generally take a random walk. The prices of particular shares may follow different distributions, but Laplace's central limit theorem tells us that the average price must comply with the normal law; and stock indexes are in fact structured as averages.

There is also another reason for price indexes being made to take a random walk. If there were a way of forecasting them, if some technique allowed us to think that in days or weeks to come they would rise, then they would rise immediately. Price evolution has no more memory than Pascal's throw of the dice. Each variation is independent of the past. Price variation regularly changes signs and there are few consecutive months in which the market goes either up or down. Variations in the same direction for five consecutive months occur in only one in ten cases. There is no way to use the price tendency in the past to predict their future direction. A price trend negates itself once it becomes known. This is another fundamental difference between the roulette wheel and the stock market; following the Martingale system in the latter – when you double your stake after a loss – leads to self-destruction.

In 1973 a renowned Princeton professor, Burton Malkiel, published his bestseller *A Random Walk Down Wall Street*, and the book was reprinted seven times in 25 years. His thesis is as follows. Today's stock market is so efficient that a blindfolded chimpanzee aiming darts at the stock price pages of the *Wall Street Journal* could select a stock portfolio that would perform just as well as a fund actively managed by a professional broker. It was Malkiel who popularized the notion of the random walk of stock prices, an idea that owed its inception to Louis Bachelier 80 years earlier.

That said, such an analysis is valid only when applied to a sizable number of stocks, as is the case with the Standard and Poor's 500-stock index, the gauge that Wall Street uses to track stock performance and for

which a portfolio is composed, by definition, of 500 stocks. Curiously enough, it was only in 1952, as we saw earlier, that Harry Markowitz based his reasoning on a portfolio of securities rather than holdings taken one by one. His seminal article that opened the way for the random walk is soberly entitled "Portfolio selection". His aim was to formulate rules of portfolio construction for investors who find expected returns desirable and variance of return (a concept not unrelated to standard deviation, as we saw earlier) undesirable.

The random walk notion may also indicate that it suffices to invest in the stock market and "go with the flow" in order to achieve reasonable monthly gains at least equivalent to the average monthly performance of the index over the most recent 10 years. If one is convinced that ultimately the future will resemble the past and that prices will continue to follow the same law of probability, it stands to reason that average future performances should be altogether comparable to those of the past. As measured in terms of standard deviation, price volatility should likewise be based on long-standing precedents. In fact, shareholder return for a portfolio randomly varies according to a distribution that appears similar to a normal law. From a statistician's point of view, observation of real profitability rates may be interpreted as a random evocation of a law of probability. If one postulates that the former randomly fluctuates, then past sequences may indeed be interpreted as samples of the law of probability for shareholder return on the portfolio. And if price variations indeed manifest themselves totally at random, past distributions may be used not only in hindsight, but also as a means of accurately forecasting.

Let's take as an example the Paris Bourse at the start of the twenty-first century. If monthly price changes are randomly distributed, there is a 68 percent chance that they will vary by no less than −4.9 percent in any one month or by no more than +6.6 percent. Since 68 percent represents approximately two-thirds, this means that in two out of every three months, these changes will neither exceed 6.6 percent nor dip under −4.9 percent. The law of probability does not indicate

which rate will be attained, nor does it indicate when. All it does is to specify the percentage chances of profitability's reaching the designated level.

A random walk does not mean that stock prices evolve haphazardly as if basic information did not exist. Quite the contrary, a random walk constantly draws on incoming data. The market is exceedingly efficient. Prices go up and down as news and information come in. Nobody is in a position to draw profit on a preliminary basis. Nobody can satisfactorily forecast the upcoming market evolution. It was Bachelier himself who wrote in his 1900 doctoral dissertation: "The mathematical expectancy of the speculator is zero." When the market is characterized as efficient, this means that no investor can make a lifelong living out of beating the market at its own game. Not a single soul can repeatedly and systematically do it. Markets vary at random. The mathematical expectancy cannot possibly be higher than the indexed average.

Speculators think and believe otherwise; their expectation is that they will outdo the market. We might say that they anticipate and draw profit from tomorrow's news. Bernard Baruch appositely wrote: "A speculator is a man who observes the future, and acts before it happens."[24] Any investor is a speculator in so far as, seeking to foresee, he or she bets. When doing so, investors may exert influence on prices, which reflect the expectations engendered by the news. And yet what was anticipated does not necessarily come into being; quite the contrary. Even if the speculator was not mistaken concerning the repercussions of the news, more recent events may have affected prices by the time of resale. It is highly likely that the speculator will *not* outperform the market; in fact his mathematical expectancy is zero. And yet he still hopes and strives to buck the odds.

In what ways do prices take into account the fundamental economic data? Some say that market price always reflects the state of the real economy. That point of view is a travesty of reality. Others contend that given the permanently observed lack of connection between share prices and the economic basics, to see one is not to believe the other.

The one obvious fact is that rather than being influenced by these data, prices are largely determined by the expectations that speculators have of them.

So how does the news affect prices? At a forum at Wharton Business School in October 2001, Professor Richard Marston (who teaches there) stated: "The economy itself, and expectations about it, are what is driving the stock market right now." Right now? Isn't this *always* the case? Expectations continually drive the market. Let's look at what happened in September 2001. During the first five days of trading after the terrorist attacks on the World Trade Center and the Pentagon, the Dow Jones Industrial Average plummeted 14.25 percent, the greatest weekly loss in 61 years. Since the beginning of 2001, the financial markets had been undergoing a phase of "bubble" bursting, in contrast to the euphoria that had characterized the previous few years. Taking as a reference the US-based computerized network for price quotations known as NASDAQ, we may note that it took 14 months to rise from 2000 to 5000 (11 months for this index to rise from 2000 to 3000 points, 2 months from 3000 to 4000 and 10 weeks from 4000 to 5000) and 22 months to bring it down from its maximum (5048.62 on December 3, 2000) to 1694.27 (on September 10, 2001). This fall may have been masked, but it was cumulatively tantamount to a crash – and it had yet to run its course. The atrocities on September 11 and the closing of American stock markets for the following four days accelerated this pronounced trend; on September 21, 2001, the index stood at 1423.19.

Given what had been going on for a year, one could be led to believe that the 16 percent loss in one week would have taken place in any event, but might have been strung out over a period approaching a month. After all, alarming news concerning the American economy had been lowering ongoing expectations. What happened was that the attacks *compressed* the impact of the negative economic news and tidings. But then, in what ways are expectations usually related to economic evolution? Here again, we anchor ourselves in the past and go on to suppose that previous links between expectations and the real

economy will be reiterated. During the Wharton forum, Richard Marston also stated:

> Because investors try to anticipate future events, stocks tend to rebound before the economy does. It is hard to make any forecast, especially about the future. But the hardest things to predict are turning points. It's remarkable how much the market moves after it reaches the bottom.

Marston was putting forward the point that speculators anticipated the "rebound". According to him, from June through October 1990, the Gulf War helped drag the Standard and Poor's index down by 14.7 percent. And yet over the next six months it rose by no less than 25.6 percent! Fast forward to the summer of 1998, when Russia was in turmoil. During July and August the index registered a 15.4 percent drop, but it rose 30.3 percent over the following six months and 39.8 percent again in the year after the end of the crisis.

Anticipations have similar sources, and it matters little whether the expectations are mathematical or based on probable forecasts. In one case the sequence is the historical mean, in the other historical correlations are used. Psychology is invariably involved and what really matters is the confidence with which we make a forecast – Keynes's state of confidence, i.e. the risk of our forecast turning out to be wrong.

Variance and standard deviation assess the variations in the profitability of a security. Do they constitute measurements of risks incurred when investing in the latter? Not to the extent that they measure pleasant as well as unpleasant surprises. And not to the extent that the future fails to renew the past. Let us examine these two negative answers.

Variability also measures agreeable surprises such as shareholder returns that are higher than expected. Is this risk? In fact risk is limited to disagreeable surprises, but as long as returns remain symmetrically scattered, that is as long as the likelihood of a happy surprise is equal to the likelihood of an unhappy surprise, standard deviation adequately

measures the risks incurred. The higher it is, the greater the danger. It is the same with the "risks" of manna from heaven, but prudent investors fear the worst more than they hope for the best.

Untimely surprises are especially dangerous when one is counting on the income drawn from one's portfolio. Capitalization is based on the principle that all such revenues are reinvested and that values may consequently be compared at several points in time. In reality, investors will want to redeem earnings or liquidate a portion of their investments before the date of termination. One may be (or at least feel) compelled to sell off one's investments at a time when prices are low, which is a disagreeable surprise. If investors regularly liquidate a portion of their investments in order to remain afloat, they will be especially aware of the risk of doing so at a time when prices are heading downwards. Stock market crises compress the per-share value of a portfolio to such an extent that more shares have got to be sold in order to draw the same revenues. Once prices rise again, it will be that much more difficult to compensate through capitalization for the transfers conceded when prices were low.

Let's take as an example an investor who retired at the end of 1998 at the age of 60 with €300,000 invested in a stock-indexed fund (a fund that follows a market index; see Chapter 9). Suppose that this recent retiree had the intention of eking out an existence thanks to the €18,000 annually withdrawn from his portfolio. If the latter had provided a regular annual return of 8 percent, it would have produced €24,000 each year in dividends and capital gains, and he would have been able to cope with the withdrawal of €18,000 per year. But from 1999 through 2001, the stock exchange went down by about 40 percent! By the end of 2001 the portfolio would have been worth only €180,000. It would have taken annual returns of 10 percent over the following period to allow for the withdrawals. Quite obviously, everything would have been different had the crisis taken place 20 years later. During that period the portfolio would have been enriched by €24,000 – 18,000 = 6,000 per annum, that is 2 percent per year. It would have increased by 50 percent and a 40

percent loss in 2020 would still have left €270,000 in the portfolio. Average 8 percent returns would have permitted scheduled payments of the required annuities. The one way to survive a stock market crisis that comes too early is to diversify one's portfolio and employ financial instruments that do not all go down at the same time. Such diversification limits portfolio volatility.

Does historical volatility measure the risk of investment for the future? Fluctuations in the vicinity of the average may give a precise idea of the risk, but this is the case if – and only if – the law of probability remains unchanged. If observations of the past are to prove useful when forecasting the future, it is necessary for the law of probability to be stable in time. Is this the case? Just like the laws of mortality, the law of probability is not a known quantity; it can only be estimated on the basis of past series. Compare the probability of stormy weather. Tomorrow's skies may be predicted as a function of meteorological parameters, provided that the climate is not fundamentally altered. Consider global warming; weather forecasting is of little avail in the event of a phenomenon rendering history obsolete! And in a stock market crisis, investors may have the impression that everything is crashing.

From 1989 through 1999 at the Paris Bourse, 95 percent of reported monthly returns ranged from +12.75 percent to −11.25 percent, which means that 5 percent of the time, returns were greater than +12.75 percent or lower than −11.25 percent; hence there had been a monthly loss greater than 11 percent for 2.5 percent of the time (or once every three years). In some cases losses become downright catastrophic – in October 1987 shares plummeted by 22 percent in a month; in September 2001 it took just a *week* for them to lose 18 percent of their previous value. That is twice as much as the lower limit of the range of confidence over the 10 previous years! Yet up to now, the market has always recovered. Even if stock market performances are approximately akin to a random walk and even if their distribution resembles a normal law, this is not what happens at the extremes. Pronounced monthly highs and lows, bubbles and crashes occur, not as often as the normal

law indicates, but more often than the normal law can possibly foresee. As Bernstein states:

> At the extremes, the market is not a random walk. At the extremes, the market is more likely to destroy fortunes than to create them. The stock market is a risky place.[25]

Financial theory tends to focus on a notion of risk limited to what we might be termed "trivial perils", those having to do with price fluctuations liable to appear in a relatively stable overall environment. Doesn't history frequently show that radical alterations in the environment provoke price variations comparable to mood swings? Maybe we just do not know how to analyze major risks. Maybe we do not know how to prevent them.

Examples have demonstrated that rather than base their expectations on past mathematical averages, investors tend to detect correlations between past events. At the beginning of his chapter on "the state of long-term expectation", Keynes wrote:

> It would be foolish, in forming our expectations, to attach great weight to matters which are very uncertain. It is reasonable, therefore, to be guided to a considerable degree by the facts about which we feel somewhat confident, even though they may be less decisively relevant to the issue than other facts about which our knowledge is vague and scanty. For this reason the facts of the existing situation enter, in a sense disproportionately, into the formation of our long-term expectations; our usual practice being to take the existing situation and project it into the future, modified only to the extent that we have more or less definite reason for expecting a change.[26]

How is such a judgment to be formulated? Investors tend to make a fetish out of economic "factoids", such as for how many months, at some time in the past, did the market anticipate and predict economic recovery. And yet they interpret such anecdotal data by connecting the

"dots" that get their attention in accordance with the "paths" they map out. As with the Impressionists (and most especially with Georges Seurat), investors spend a great deal of their time *connecting details*. The brain is organized in order to detect correlations. Numerous studies have shown that investors revise their predictions by overemphasizing new information in relation to pre-existing and long-term data.[27] Curiously enough, the mechanism of risk analysis is altogether different. Rather than behave as they do when forming expectations, investors often use historical (mathematical) volatility to assess the risk of a possible investment. Experience shows that volatility constitutes an excellent basis for risk evaluation; what skyrockets may plummet just as precipitately.

That said, the relationship between risk and return is not as fluid as theory would have it (we shall return to this point). The connection between risk and return is not a detail. It is not because a portfolio presents high risk that one may reasonably expect to win the "sweepstakes". Moreover, unforeseen correlations do crop up; they merely were not noted in the past. Last but not least, volatility evolves along with time. One may think that the dispersion of returns (additional volatility) would increase in times of economic and political uncertainty. The sensitivity of a financial asset to market variations may be estimated historically, but this should only be the basis of ongoing anticipation. Volatility also must be anticipated.

When managing risk, diversify

When he drastically modified the risk theory of financial markets, Markowitz reasoned in terms of a portfolio. A portfolio is a whole group of financial assets. Its overall profitability is the sum total of the return on each asset weighted in terms of the proportion represented by its value with regard to that of the entire portfolio. Portfolio profitability is the weighted average of returns on the securities included in it. Yet the

risk incurred is another story entirely. A portfolio's volatility is less than the average volatility of the securities from which it is constituted; that is why diversification is basically praiseworthy.

Markowitz's singular contribution consisted in providing precise instruments to measure diversification. These instruments allow for the constitution of a portfolio supplying optimal returns for minimal risk; Markowitz terms this an efficient portfolio. No efficient portfolio is superior to any other. Each is simply the best in its category of risk; it offers the highest expectations of returns for a given risk. And in a rigorously equivalent manner, it offers minimal risk for a given expectation of returns. If an efficient portfolio offers comparatively higher returns, it must also present more risks.

Instances of random deviation have a tendency to cancel each other out in a portfolio. This is called diversification. There is an important parameter known as the *correlation coefficient*, whose role is to assess the benefits obtained through diversification. The correlation coefficient measures the degree of correlation between two variables. The greater their tendency to move in concert at the same time, the higher their correlation coefficient. The range of values this takes is between -1 and $+1$. If the phenomena are perfectly correlated, the coefficient is $+1$. If they are inversely correlated, the coefficient is -1. If they are not correlated at all, the coefficient is equal to 0. As for two positively correlated shares, the periods of strong returns for the first correspond to the periods of strong performance for the second; the same for poor performance. When the shares are negatively correlated, underachievers accompany overachievers. When there is no correlation at all, A's performance has nothing to do with B's.

Diversification brings together two random variables that are not strictly correlated and thereby diminishes average risk. The interest of Markowitz's theory basically consists in his having mathematically expressed the fact that the important parameter is the correlation coefficient and that what matters is to estimate correlations involving multiple phenomena.

It is often supposed that investors do not like risk; they are convinced that the good surprises fail to compensate for the bad ones. They would consequently prefer the same returns while incurring a lower degree of risk.[28] The more the correlation coefficient is negative, the more one endeavors to diminish average risk by applying negatively correlated instruments. If the investor is indeed "risk-averse", he will make sure that the latter are as negatively correlated as is feasible. Then again, the mere fact that the financial instruments are not strictly correlated enables diversification to play an appreciable role.

The correlation of two financial instruments takes on a value between -1 and $+1$. The lower the correlation between a financial asset and a portfolio, the more the volatility of the latter is diminished once the former is added to the portfolio. If one adds securities that are negatively correlated with the portfolio, then the volatility of the latter will be very much diminished. If the new financial assets have no correlation with the portfolio (its coefficient correlation is 0), adding such a security will nonetheless reduce the volatility of the portfolio. Even with a positive correlation coefficient, provided that it is less than 1, adding a supplementary asset diminishes the risks incurred by a portfolio.

If we limit ourselves to stock portfolios, studies show that maximal risk diversification is attained with at least 20 shares of firms operating in heterogeneous industrial sectors. Needless to say, if you specialize in stocks for skis, ice skates, fur jackets and 17 shares in industries related to cold weather, your portfolio will be poorly diversified notwithstanding your 20 shares! In contrast, you must try to introduce shares that are not positively correlated. It is also necessary for the probability distributions and the degrees of correlation between them to remain stable for a sizable length of time. The more we study long periods of time, the less reliable are the available statistics. *How long is long enough?* During calm spells studies by institutional investors analyze and survey the degrees of correlation that may exist between the different categories of financial assets: the stocks of large-scale groups, medium-sized companies, government bonds, corporate bonds, junk bonds, real estate,

hedge funds and so on. One must remember that securities that are riskier than a portfolio when taken individually may, in spite of everything and provided that they are not correlated with the portfolio, reduce the overall risks of the latter.

Such factors help to explain the interest in international diversification; it can be expected that economic crises will not take place simultaneously in every country. This approach is supported by the observation that in each country, stocks evolve as a function of the ups and downs of the local economy. Money flows likewise introduce negative correlations between stock market performances and exchange rates. Lowering risk through international diversification largely compensates for the risk linked to exchange rates. Yet with the ongoing internationalization of the activities of quoted companies, the impact of purely local or national factors tends to diminish. A French economist, Bruno Solnik, has shown that for an internationally diversified firm, asset returns are determined to a significant extent by non-domestic (rather than domestic) factors. Moreover, the sensitivity of individual company returns to non-domestic factors is integrally linked to the scope of their international activities, as represented by the relative importance of foreign sales in relation to total sales.[29]

It has been shown that portfolio risk is reduced by introducing shares from emerging countries, whose volatility is nonetheless much greater than that of industrialized countries. The key to the mystery is that the shares of the former are only weakly correlated to those of the latter. Portfolio performance is enhanced once shares of emerging countries are brought into the mix. At least that is the case in normal times. Financial crises occasionally breed correlations that foil the best-laid mathematical schemes.

During a stock market crash in a given country, it often happens that the local currency also bites the dust. Losses for a foreign investor are even more agonizing than those suffered by a domestic investor; this is due to the correlation that appears in times of financial crisis between exchange rate risk and overall market risk. In the Mexican crisis from

December 1994 to March 1995, shares dropped by about 30 percent. That said, over the same period an investor who had acquired Mexican stocks with dollars would have endured a loss of 65 percent – 35 percent more – on account of the devaluation of the Mexican peso in relation to the American dollar.

A financial crisis makes correlations appear in places where they were not expected. The "tequila" effect of the Mexican crisis made investors massively sell off their shares in emerging countries. So it was that the crash spread to numerous Latin American countries and also had a ripple effect across the Pacific, in Indonesia, Thailand and the Philippines.

In fact the risk of a security is composed of two distinguishable sets of risks. Systematic risk is that which cannot be eliminated through diversification strategies. It is the risk inherent to the system, the market risk. Specific risk is proper to the financial asset under consideration. It is a reflection of the risk that something happens and affects the asset (and the asset alone). This risk disappears by dint of diversification.

These two risks are independent; their correlation coefficient is 0. Total risk is the sum of the two. Three experts – William Sharpe, John Lintner and Fisher Black – have put this observation to work by building the *Capital Asset Pricing Model* (CAPM). The CAPM indicates the price of risk. You may recall that Louis Bachelier established that: "The mathematical expectancy of the speculator is zero." As for the CAPM, it establishes a simple rule on the basis of two hypotheses: markets are in equilibrium; all investors believe in Markowitz's theory and they choose their investment out of the same set of efficient portfolios. The rule postulates that the mathematical expectancy for an investment in a security or a portfolio must be proportional to the systematic risk. Since specific risk may be eliminated by diversification, it will not be remunerated by the market. On the other hand, the value of a portfolio has to include remuneration for the investor of an amount in proportion to the degree of systematic risk.

Market risk is attributable to the ongoing evolution of financial assets; it dictates the fluctuation of a given security. Some stocks react strongly to market movements; others do not. The degree of sensitivity to overall market fluctuation proper to a given security is known as the *beta coefficient* (the estimated coefficient of independent variables in a regression equation). It historically measures the systematic risk proper to a given security on the basis of comparison between the price fluctuations of the security and the fluctuations of the financial market taken as a whole. A security with a 1.0 beta presents the same risk as the market. With a beta lower than 1.0, its risk is also lower than that of the overall market; the security attenuates market fluctuations. With a beta higher than 1.0, the security tends to amplify market fluctuations. With a beta of 2.0, the instrument moves twice as much as the market. If the market rises by 10 percent, it goes up by 20 percent; when the market falls, it goes just as precipitately down. Yet for a given security, the beta does not necessarily hold steady. In other words, it takes on different values in accordance with the periods for which it is measured. On the other hand, the beta value of a market portfolio shows more stability over the course of time. It measures the responsiveness of this portfolio to market fluctuations; it quantifies its volatility.

The CAPM establishes a logical relationship between expected rate of returns and portfolio volatility. The greater the latter, the greater should be the mathematical expectancy of high returns. The CAPM shows that the expected returns for a portfolio should exceed that of a risk-free investment; this may be attributed to a *risk premium* whose amount is proportional to the beta coefficient.

However, empirical studies do not exactly confirm this theory. In a study dating from 1992, two American researchers, Fama and French, considered the monthly returns of stocks quoted in New York from 1963 through 1990.[30] These stocks were distributed into 10 portfolios in accordance with their beta coefficients. The first contained those stocks whose beta was weakest; its volatility was assessed at 0.8. The volatility of the second portfolio was assessed at 0.9 and so on. The last portfolio's

volatility was rated at 1.7. Returns should have grown at the same rate as the relative degrees of volatility. Nothing of the sort took place; no correlation emerged. In a more recent study (June 1999) another researcher, John Cochrane, demonstrated that even though a correlation does in fact exist, "small cap" shares provide returns that are higher than their volatility would convincingly lead us to believe.[31]

The trouble with these theories is that statistical tests on returns obtained after the fact fail to render them perfectly justifiable. Practice shows that professional investors base their choices first on historically attested volatility and second on expectations of returns. Portfolio theory is regularly applied. That said, investors often anticipate in an erroneous manner. If they expect prices to rise and choose volatile portfolios in order to make profits, a market downturn will aggravate the effects of disappointing results. It is not because the expected return on a portfolio is 15 percent that it will supply such sizable returns. Risk justifies the fact that an investor demands higher returns than is the case with risk-free rates, and quite rightly so. The CAPM shows us that the more risks are incurred, the higher the returns an investor must demand. However, this is not tantamount to asserting that the higher the risk, the more favorable the returns obtained! Were this the case, it would behove us to take a maximum number of risks, to run up debts and to invest borrowed money in a market portfolio clearly reflecting systemic risk. In the long run, each and every gambler would make a fortune! One would be better off going for broke and putting borrowed money into play on the roulette wheel or on horse races. Were rewards proportional to the risks incurred, gambling would invariably be the best bet. Statistical tests apply to history-based returns or volatility; as for the model, it functions with expectations of returns rather than time-based averages and with estimates of responsiveness instead of past volatility. Expectations of returns may indeed prove to be proportional to the risk incurred, and yet obtained returns may turn out to be disappointing.

Another criticism is that such tests ought not be restricted to stock market securities. When calculating the beta coefficient, the reference

market needs to include all the financial instruments and all assets in which the fortune of the world may be invested: unquoted equities, real estate, raw materials, precious metals, the art market and so on. That said, such criticism is basically technical.

More criticism should rather be addressed to the hypotheses that underpin the CAPM. As we saw above, this reasoning is predicated on a strong hypothesis according to which everyone has the same vision of the future. All investors are said to form identical anticipations; as a result, there supposedly exists but only one envelope of efficient portfolios. This assumption is also part and parcel of a well-known economic framework in which markets are always in equilibrium. This basis for CAPM does not hold water. Markets are never well-balanced; any equilibrium is always shifting. Equilibrium between supply and demand is achieved through prices; continual changes in the latter reflect a perpetual displacement of the point of equilibrium.

The second basis for the CAPM logic consists in the would-be existence of a single efficient envelope of portfolios, the set of all the superior portfolios possible in Markowitz's framework. Yet in order for this envelope to be unique, it would be necessary for all investors to hold the same predictions. However, if everybody shared the selfsame vision of the future, there would be neither buyers nor sellers! In reality, when we talk about markets we evoke transactions; any transaction features the divergent viewpoints of the buyer and the seller. So there can be no single efficient envelope of portfolios. In practice, many investors believe that their idea of the future is more prescient than that of their neighbors. They do not invest in the same portfolio as the rest of the market. Moreover, when there are several points of view, there also exist several portfolio envelopes. One may even wonder whether the number of efficient envelopes is not equivalent to the number of investors, in so far as each of the latter foresees the future differently. If this is the case, one must admit that portfolio structures may differ greatly among particular investors, which does not necessarily call into question the analytical frame of reference. We must not forget that investors have

differing horizons; while some of these are short term, others are long term.

Predictions for the future are relevant to a given horizon of investment. When you think of investing over two to three years, you formulate hypotheses on that time span. But if you are a long-term investor (+ 8 years), you tend to rely on trend analysis. When there are sellers and buyers, there also exist several points of view. And if there is a market, sellers and buyers do exist. The market arbitrates their differences. There is no such thing as a consensus about the future. At any given point in time, one may find many efficient envelopes of possible portfolios.

When managing risk, wait and see

Why does it matter that returns or risk are analyzed over an annual or monthly period? Fund managers – who also go by the name of "institutional investors" – have their performances rated, month in and month out. If they show a tendency not to succeed time and again, out they go. Yet many of their customers have decided to invest for 10 years or more. The risk of error depends greatly, but not exclusively, on the volatility of the instruments in which one has decided to invest. Volatility may be measured on a monthly, quarterly or yearly basis. It is measured objectively, independently of a given investor's horizons. This is quite evidently wrong.

For a given investment, volatility and subsequent uncertainty hinge on the duration of that investment. Whereas the uncertainty inherent in weather forecasting goes up over time, the risk associated with a security goes down the longer it is held. Theory shows that the more durable the investment, the lower the volatility. Jeremy Siegel's previously cited analysis shows that stock volatility in fact diminishes in time even more rapidly than theory would have it.[32] What is more, the decrease in risk for stocks is almost twice as rapid as that experienced by fixed-rate

instruments. If equities are more risky than bonds and Treasury bills for short investment horizons (at most two years), they become less risky when the holding period stretches out to five years minimum. For 30 years, the risks associated with stocks are a third lower than those entailed by fixed-rate instruments. The former go down more rapidly than theory leads us to believe, while the latter reduce more tortuously.

Jeremy Siegel studied actual extreme returns for American stocks and bonds held for periods spanning 1, 5, 10, 20 and 30 years over the course of nearly two centuries (1802–1997). When the holding period is extended, the risk factor diminishes even more. There are two ways of making this graphically clear. First, one may take into account the best and the worst performances. Maximal and minimal returns diminish the longer stocks are held:

- From + 66.6 percent to –38.8 percent for a one-year investment.
- From + 41.0 percent to –31.6 percent for a two-year investment.
- From + 26.7 percent to –11.0 percent for a five-year investment.
- From + 16.9 percent to –4.1 percent for a ten-year investment.
- From + 12.6 percent to + 1.0 percent for a twenty-year investment.
- From + 10.6 percent to + 2.6 percent for a thirty-year investment.

Whatever five-year period since 1802 is taken into account, as we saw at the beginning of this chapter, the worst five-year return on stock investment was –11 percent per year, a figure scarcely inferior to that pertaining to bonds (–10.1 percent). For a twenty-year stock investment, the worst returns always remain positive. With returns of 1 percent, stock investment over 20 years never fails to successfully contradict inflation. When stocks are held for at least 17 years, an American portfolio has *never* shown negative real returns. In other words, the risk has become nil.

The second way of demonstrating the risk factor is to note standard deviations for investments in stocks, bonds or Treasury bills. The first are

in principle riskier than the second, which are in turn more risk fraught than the third. Once the holding period lengthens, the variability of these three types of assets tends to diminish. For a one-year investment the standard deviation was 18 percent for stocks, 9 percent for bonds and 6 percent for Treasury bills. The standard deviation for equities fell to 12 percent for two years, to around 8 percent for five years, to slightly more than 4 percent for ten years and to 2 percent for twenty years of holdings. Over twenty years the risk associated with stock investment becomes even less pronounced than that associated with bond investment; over thirty years, stock volatility is a third less than that associated with Treasury bills.

If one sticks to stocks for a sufficient amount of time, the returns on such an investment grow less and less subject to chance. Little by little, they go back to the statistical average. Their behavior is that of a parameter gravitating around its average value and never cumulatively breaking away. Think of a rubber band that may be stretched to a certain point and yet never snaps. The longer the duration of the investment, the less the pressure put on the rubber band, that is the less returns vary or depart from the norm. In contrast, the longer one remains invested in fixed-income instruments, the more the volatility of real returns grows. In fact, this divergence betrays a tendency of cumulative distancing from the average.

The deviations of these quantitative instruments are explained by the negative cumulative influence of inflation on the reward for investing. The disastrous real returns on German state-issued bonds in the 1920s and on Japanese state-issued bonds following the Second World War correspond to periods of galloping, double-digit inflation in the two countries. These are also to be found – but to a lesser degree – in US and UK government bonds dating from the 1970s. Once inflation picks up, the process becomes cumulative and bond investors have no chance to compensate for the loss in purchasing power by dint of returns on their investment. Quite the opposite, inflation penalizes long-term securities and increases nominal interest on new ones. This helps to explain the

cumulative distancing from the average that characterizes fixed-income instruments. Risk measured in terms of volatility goes down as investment duration lengthens. It nonetheless seems to be the case that risk pertaining to the riskiest of assets diminishes more rapidly as time goes by than is the case with those entailing minimal risk.

The more the investment duration lengthens, the fewer the risks presented by a given security. What appears paradoxical is that while volatility is calculated in terms of yearly rates of return, it in fact diminishes the longer the investment lasts. Yet investment horizons play a prominent role in the evaluation of risk. Institutional investors are judged in terms of their monthly performances. Retired people may well require a steady monthly income. Forty-year-olds readying themselves for retirement are thinking of terms of a twenty-year horizon. From their point of view, price variability does not constitute a risk factor. Given the period of time involved, for them stock volatility amounts to next to nothing. The way volatility is measured does not take this into account.

The above analysis, according to which stock market investment over a sufficiently protracted length of time always turns out to be the best, has led some commentators to wonder why there should be a risk premium that would compensate an investor for the risks incurred on his portfolio of stock. The historical variability of prices, that is the amplification of market variation, is certainly one component of risk. As we have already seen, volatility is a risk for the investor who may be compelled to sell off his shares at a time not of his choosing, for example when the market is in the throes of a crisis. But in that case, why is there a risk premium for stock investment when waiting long enough means playing it safe? Why does the market require higher returns on stocks than on bonds, even though the former turn out, in the long run, to be more profitable than the latter? The same reasoning may be applied to specific risk: it can be eliminated through diversification; it need not be remunerated by the market. Why, to put it briefly, should the market remunerate the evanescent risks incurred by stock investors? Let time pass and your investment becomes less a Pascalian wager and more a minutely

calculated risk; elapsed years ensure a form of diversification. No premium appears to be called for.

That is one of the explanations put forward for stock market rises occurring during the bull market at the end of the 1990s. Investors apparently agreed to buy high-priced stocks because they were resigned to rather low returns on their investments. Hoped-for profits would be low, as were interest rates; the risk premium was all but negligible. The disappearance of the latter may be explained by statistical analysis demonstrating that that waiting game pays off; returns on stock investments are bound to overtake those obtained by bond or Treasury bill investments. And yet, polls performed at that era showed that institutional investors were aiming for risk premiums of an average of 4 percent, a figure aligned to historical averages of great duration. The one other explanation would consist in claiming that investors were expecting ever-higher profits amounting, as subsequent developments would make clear, to "pie in the sky". In reality, stock investment had grown more risky; investors should have insisted on a heightening of their risk premium. At that time Caps, a consultancy for British-based pension funds, had demonstrated that from 1995–2000, stock market volatility had been twice that of the preceding five years (1990–95). Yet the real return from investing in equities had been halved over the same period. The fact is that investors had not taken into account the risk increase accompanying the price increase. Had they been more perspicacious, the bubble could not possibly have been formed.

In the long run – but one must wait 15 or 20 years – volatility tends to disappear and the risk premium should no longer exist. Long-term investment is an investment in the market, in a portfolio that faithfully reproduced market variations. Long-term portfolio risk gradually diminishes, so CAPM does not apply. For short periods (three to five years), investments are performed on the basis of growth prospects and not as a function of volatility. In the short term, there is no required rate of return, no long-term analysis, no fundamental valuation; all value is marked in the daily revaluation of the stock exchange. And so, rather

paradoxically, CAPM could be utilized neither for the long haul nor the short term. It nonetheless constitutes an irreplaceable analytical framework when establishing anticipations.

There are two basic approaches to financial markets and their fundamental logic. The first (which will be considered again when we analyze investor behavior, corresponding to passive or index fund management) draws on double diversification in space and time. Diversification in space involves a multitude of financial instruments designed to reduce the risks proper to each and to accept only non-controllable, systematic risk. When investing in stocks you should remember that it is important to diversify into more than 20 of them to make the most of the diversification effect in accordance with the correlation existing between these different stocks. However, this is equally the case when you invest in gold, real estate, bonds or Treasury bills.

Concerning possible stocks, observe the way in which the firm defines its "corporate strategy". Choose those that are focused, as Zook and Allen showed,[33] on expanding and innovating in and around their core business. It is up to the investor – and not to the company – to diversify. Such reduction of risk is accompanied by diversification in time; you have got to invest over a long period. If you go for the long haul, you tend to render your investing steadily less hazardous. This is a form of passive investment corresponding both to Warren Buffett's practices and to the classic definition of the speculator. Speculate on the future, invest and stay invested.

The second approach is more speculative in the sense of *speculum*, a mirror; Keynes's beauty contest comes immediately to mind. In this case, a speculator buys stock only for the sake of short-term capital gains rather than for long-term income. Keynes used the term "speculation" for the activity of forecasting the psychology of the market and "enterprise" for the activity of forecasting the prospective yield of assets over their whole life. He despised speculators' gambling instincts. He felt that they were simply trying to outguess and outwit one another "to beat the gun",

rather than striving to project and compute the cold mathematics of future cash flows and associated risks. This analysis explains the highly erratic stock variations registered from one day to the next. Keynes claimed that the valuation of capital assets consequently established was "arbitrary" in so far as it had devolved into a forum for speculation rather than entrepreneurship. This is still the case. But since Keynes's time, the financial world has learned how to measure the state of confidence with which we forecast the prospective yield of financial assets over their whole life. We now know that long-term investment in a well-diversified portfolio bolsters our confidence in financial investments. Within this framework, the selection of assets relies on more subjective and qualitative factors.

Thus there are two approaches at work. The first is long and diversified; the second is necessarily limited in time. There exists a quantitative philosophy predicated on the past history of returns and volatility as well as indicators of responsiveness such as the beta coefficient. There also exists a qualitative philosophy through which one endeavors to identify factors that will orient prices in the near future.

In the end these two philosophies come together. Expectations for the future are based on statistical analysis of results recorded in the past. The short-term qualitative approach fits into Chinese boxes with regard to the long-term quantitative approach. Asset allocation is in conformity with long-term quantitative analysis and selection of individual assets remains qualitative and short term.

5

The price of stocks

Irving Fisher was a celebrated American economist who was at the origin of numerous concepts in finance. Nonetheless he was vilified at the time of the Great Crash, because he maintained that stock prices had reached a plateau. In autumn 1929, the market value of all shares listed on the New York Stock Exchange plummeted by 30 percent. Many analysts then and now have taken the view that stocks were overvalued and that the market stood in need of a correction. Irving Fisher argued at the time that in fact the fundamentals were sound and the market was *undervalued*. In a paper published in December 2001, Ellen R. McGrattan and Edward C. Prescott, both of the Federal Reserve Bank of Minneapolis, estimated the fundamental value of corporate equity in 1929 and compared it with actual stock valuations.[1] They came to the conclusion that the Great Crash was not attributable to overvaluation. The evidence strongly suggests that on the contrary, even at their 1929 zenith when the Dow Jones reached 379.61, stocks tended to be quoted low. However, the Dow fell to 41 in June 1932. In another article the same authors demonstrate that in the first half of 2000, the overall value of US corporate equity was close to 1.8 times that of GNP and that because it was equal to the value of all productive assets in the US corporate sector, at that price it was correctly valued.[2] In 2000 the Dow Jones was at around 12000, only to fall to 7500 two years later. Two tales of a bubble that wasn't! As Adam Smith observed in the Wealth of Nations, the word value has two meanings: the value in use measures the utility of an asset,

the value in exchange its purchasing power. In one of his afterthoughts on the history of capitalism, Fernand Braudel explains that everything that stays outside of the market has only a value in use, all that pass the footstep of the market acquires a value in exchange.[3] The value in use can be defined as the value of an asset calculated by discounting the future cash flows obtainable from its continued use. Many market economists in America explain that the market price reflects long-term cash flow prospects, a value in use. On the contrary, there are a number of economists in Europe who consider that the stock price is only a value in exchange. They are very critical of the so-called investor's rationality in determining market prices. They have adopted Keynes' view that investors are concerned, not with what an investment is really worth to a man who buys it for keeps, but with what the market will value it at, under the influence of mass psychology, three months or a year hence. For most European economists everything depends on waves of irrational psychology.[4] The relationship between price and value is a puzzle that has baffled economists since times immemorial.

The value of art and the art of value

Value explains prices without ever actually making an appearance. To parody Oscar Wilde,[5] on a market everybody knows the *price* at which a stock is quoted, but nobody can claim accurately to appraise its *value*. Nevertheless, ideas on the subject are not lacking.

Value is an abstraction that helps us to comprehend market-determined prices, just as the hypothetical substance known as phlogiston was thought to enhance our understanding of combustion. Before the eighteenth century every combustible substance was thought to consist of phlogiston, which was liberated through burning, and a residue. German chemist Georg Ernst Stahl declared that the rusting of iron was also a form of burning in which phlogiston was freed and the metal reduced to an ash. The theory was conclusively refuted by the

great French chemist Antoine Laurent Lavoisier (1743–94), who showed that burning and rusting both involved oxygen and drew the conclusion that both ash and rust were compounds of oxygen.

Comparison of the art market, the stock market and the price of goods provides a telling illustration of the interplay between price and value. The price of goods is calibrated with production costs representing objective value at a given point in time. The price of stocks brings to bear the expected growth of company profits; this is subjective (and would-be future) value. As regards the art market, beauty is in the eye of the beholder! And yet all three of these disparate markets are *priced*.

In front of a Rembrandt, one may retain the illusion that the work has an objective value that controls excesses. But it is impossible to cling to this fiction when confronted with conceptual art that prioritizes the idea – and not the actual realization – of the work of art. A reconstituted and naturalistic fly was sold for $80,000 at Christie's. A department-store mannequin adorned with a mold of artist Charles Ray's sexual organ was priced at $2 million. A bag of candy signed by Cuban-American artist Felix Gonzalez-Torres was put on sale for $0.5 million.

The stock market differs from the art market on at least three dimensions. Investment in financial instruments offers virtually no interest outside income collection. Revenues are derived from the productive activities of companies involved in existing economic areas. But works of art produce no income. They satisfy no need, only desires. The value of antique paintings varies as a function of buyers' desires. To guess the sum at which a work will be priced, an art expert has to measure what purchasers crave, as channeled through fashion and mimicry ("keeping up with the Jones"). And financial evaluation? Investors are fortunate enough to have an inkling as to what they will earn. As this may merely be forecast, psychology and fashion will play a significant role.

The art of old masters only exists in limited quantity. It is no longer under manufacture. Financial assets are quite another story. Securities grow in number when companies issue new stocks and shares to finance their investments. The number of such instruments decreases when the

issuers redeem their debt or buy back their own shares. The supply of financial instruments fluctuates in accordance with economic developments; the art market consists of the works held in stock.

Those who sell artwork generally use capital from sales to buy other works. Museums never sell anything. The art market would seem to be a closed one. By contrast, financial markets constitute a reservoir whose level goes up or down as individuals save more and spend less (or vice versa): demand (supply) is related to the actual economy through flows of savings (spending).

The two markets nonetheless present three common features. The value of a stock and that of a painting both hinge on the price that a buyer is ready to pay and the sum of money that the seller requests. All told, values revolve around supply and demand. But then again, the factors leading to the sale of an artwork may not be in opposition to those motivating its purchase. It is different with stocks. The seller's way of looking at the future is diametrically opposed to that of the buyer.

The degree of trust and its polar opposite, the fear of losing, at times impel financial investors to jump on the bandwagon. Prices are influenced by unpredictable collective psychology and the dictates of fashion. In the same way, the effects of fads and changing tastes propel the market assessment of certain pictures or schools of painting towards stratospheric levels. The painter Meyssonnier sold his works at incommensurably higher prices than did Van Gogh (the former died a few months after the latter). A century later, the ratio is inverse.

The two markets include subsets whose prices are subject to divergent tendencies. Just like works of conceptual art whose value does not entirely depend on the art market, "new economy" stocks may be swayed by price gyrations occurring independently of the financial markets.

This comparison shows that like the sale of a stock, the sale of a work of art indicates the momentary market price. That said, what is the

relationship between price and value? Is Charles Ray's mannequin truly and intrinsically worth $2 million? Is General Electric worth $300 billion? Does it make any sense to say that on the basis of today's prices its value is such? How are we to explain that with these criteria, the value of General Electric has multiplied tenfold in 10 years? How are we to explain that in 2001 alone, the value of the same company halved, the share price having reached 53.55 and plummeted to 28.50?

> Investing, said the father of security analysis, Benjamin Graham, is like being in business with a Mr Market, a manic depressive whose mood swings sharply between fear and enthusiasm. Sometimes Mr Market's price is wildly above (or wildly below) any intrinsic value, and this is when the investor should sell (or buy).[6]

The trick is to work out what this intrinsic value is. Economists have always drawn inspiration from the idea of a natural price. Buried in this attitude is a belief that there is a fair or just price for any product, based on the costs of raw materials and labor. This tenet goes back to Aristotle 350 years BC. On the markets the natural price goes by more than one alias, most notably fundamental or intrinsic value.

For the past 20 years the fundamental or intrinsic value of a company has been known in market and investment bank practice as "enterprise value". As we mentioned earlier, this term had been utilized by John Maynard Keynes in opposition to "speculation". The intrinsic value of a stock cannot be found on the basis of its cost as with merchandise; rather it is analyzed in terms of its earnings performance, that is the income it procures. When we are appraising the value of a stock, it suffices to add up the dividends that it will make available over future years. When calculating, what matters first is to foresee future dividends and then to observe momentary interest rates so as to convert these anticipated dividends to present value and determine their worth as of now. The actual calculations are highly complex, but the idea behind them remains the same: analysts are concerned with companies' long-term capacity to generate profits.

In 1930, over 2,000 years after Aristotle, Irving Fisher presented in *The Theory of Interest* the idea that the worth of assets is determined by converting all anticipated incomes (returns minus costs) to present-day value. Since that time, methods for analyzing enterprise value have taken major strides. In 1938, John Burr Williams published *The Theory of Investment Value* and illustrated the merit of discounted cash-flow analysis in establishing value. Today, nearly all the financial analysts who assess the value of stocks in banks and investment funds employ this method, whether they are on the sell side or the buy side.[7]

Each person interested in a stock puts forward his or her opinion on its value; financial analysts may or may not have given their view behind the scenes. As a function of this, each party conducts himself in one of three ways:

- He deems the stock of higher worth than its price and decides to buy.
- He deems the stock of lower worth than its price and decides to sell.
- He leaves well enough alone.

There are four and only four reasons that may explain a conscious decision to do nothing:

- The interested party thinks that the stock is worth less than its price but he is not a holder.
- He thinks that the stock is worth less than its price but that the latter will end up rising and he will sell then.
- He thinks that the stock is worth more than its price but that the latter will keep on falling and he will buy later, for less.
- The stock is accurately priced (this is the most frequent reason); nobody is selling or buying.

As soon as the price surpasses the "enterprise value" figure, the rise triggers sales operations that bring it back to the latter. Buying operations lead to a similar result when the price is wildly below

enterprise value. Such movements *should* make prices gravitate towards this value. But can one honestly expect that the stock price reflects it? Obviously not, for if a stock were "accurately" priced, no investor would either sell or buy it. Contrary to the common wisdom, I do not believe that there exists a market consensus in relation to enterprise value. Were consensus to exist, there would be no market.

Almost all analysts use the same methods of calculation when endeavoring to determine the value of a given company. The most frequently employed method consists in calculating enterprise value in terms of DCF (discounted cash flow); there does exist a broad-based consensus on this subject. Discounted cash flow valuation is a metric that appraises the value of a firm taken as a whole according to expected future profits. Common experience has allowed practitioners to pinpoint largely shared standards based on some principles of coherence meant to analyze the development of a company. There exists strong coherence, for instance, between the company growth rate, the return on its assets – known in practice as return on invested capital (ROIC) – and the series of forecasted cash flows. The parameters accounting for 80 percent of the value of a firm are ROIC and the growth rate. The former hinges on in-house company management and the latter on outside markets. This subject will be taken up again in Chapter 8.

That said, such parameters are not mere abstractions. A company is a community of individuals, it sells its goods to customers, it goes about business in a competitive framework. Its growth and ROIC have a great deal to do with these three major factors. Quite understandably, analysts' anticipations of the company's capacity to make the most of such factors feature many shades of gray. They achieve no consensus when attempting to forecast a firm's future cash flows.

Analysts manifest no more agreement regarding the rate they use. The much vaunted discount rate is contingent on a "risk premium" – the additional return that investors demand to compensate for the risks of holding shares – which is the most important and the most controversial

figure in finance. Divergent views on this subject may be provided as support for virtually all equity values. It may happen that all analysts are wrong as regards the cost of risk at a given moment. That was the case during the speculative bubble of new-economy stocks in 2000. Only in hindsight did we learn that the peak of the bubble had been reached in March 2000. It was two months later that some financial analysts started drawing attention to the errors being committed by buyers. For instance, those at HSBC (the largest European bank) took note of the following in a May 2000 research report:

> Investors tend to bid new economy stock prices on the basis of short-term growth without examining its sustainability. Most of the mature industrial sectors are rated at around 15×2000 earnings despite a wide spread of different earning expectations out to 2001. Mature industries might be expected to grow in line with long-term GDP assumptions, which is understandable. But the long-term expected growth rates for the new economy stocks prolong the expected growth from the analysts' consensus for the next three years. This is not understandable.

In order to show that the growth hypothesis implied in prices was excessive, HSBC analysts used a simple model to determine the 10-year growth rate implied in March 2000 stock prices. The model assumed that earnings would follow a three-step sequence: ten years of high growth (e.g. 16 percent for Internet stocks), five years of fadeout (e.g. 16 percent, 13 percent, 10 percent, 7 percent, 4 percent) and 2.5 percent real earnings-per-share growth thereafter for all stocks. They discounted the resulting revenue flow at a discount rate incorporating interest rates and a risk premium assumed to be 3 percent for the US. The results are instructive (see Table 5.1), especially when compared with stock performance in 2000 (the buyers returned to their senses in the second part of that year).

As early as March 2000, one could easily see that expectations for telecom equipment and the Internet appeared overly sanguine and

Table 5.1: HSBC model to determine the 10-year growth rate implied in March 2000 stock prices

Sector growth rates	2000 stock performance	10-year real EPS implied in prices
Fixed line	– 40.3	– 2.0%
Wireless	– 53.9	9.5%
Computer hardware	– 29.4	5.8%
Semiconductors	– 20.4	4.5%
Telecom equipment	– 41.6	11.8%
Computer services	– 16.0	7.5%
Internet	– 72.2	18.8%
Software	– 45.8	7.8%

vulnerable to erosion, and indeed the performance of these stocks was seriously eroded during the rest of the year.

These optimistic forecasts did not induce the buyers, as should have been the case, to heighten the cost of volatility. As already mentioned, in comparison with 1990–95, volatility had doubled in the five years preceding the bubble. If buyers did not wish to take this into account, it was because they did not believe that the rise in volatility would be sustained. They were wrong!

Enterprise value is a fair evaluation at a precise point in time, on the basis of present-day forecasts, of the cost of time for that period and the cost of risk at that moment. It is not a natural value; in fact there is no such thing as a natural value. Goods (and labor) are worth whatever price is agreed for them by a buyer and a seller negotiating freely in the market. There exists a price for a stock on the market. There may exist an overall fair value for an enterprise. There does not exist a fundamental or intrinsic value for a stock.

The market will fluctuate

Legend has it that the American banker John Pierpont Morgan was once asked what the market would do over the following months and he replied: "The market will fluctuate." Today's newspapers feature banner headlines about billions of dollars going up in smoke. Stock market capitalization may have gone down by billions of dollars, but that does not mean that taken as a whole, investors have lost that sum of money. They may feel poorer than yesterday, but had they bought their stock years before, they could still be winners.

A share constitutes an almost perfect dream. When a small shareholder buys stock, it is with the hope of getting rich, yet he or she cannot know to what degree. Quite often he makes his purchase after reading advice in the press, in which analysts' recommendations are at times limited to a single word: sell, keep, buy etc. The process of rational study leading to this advice is obscured and the recommendation comes across as a mysterious shibboleth emanating from the most scholarly and best-informed precincts. Infatuation with supposed pundits favors stock market mimicry; when everybody believes in the model quotations go up, and everybody tends to draw the deduction that the stock market – that is the community of the best and most fully informed operators – has ratified the validity of the model. The buyer's rule of thumb that impels me to buy when I am convinced that others are about to do likewise, has nothing whatsoever to do with the model's real relevance and everything to do with fashion and fads. So it is that when prices nosedive, one feels taken in by a sucker punch.

Such irrationality favors comparison of the stock market to a game of chance in which most players have trouble envisioning the loss of their initial outlay. If what matters above all is to estimate the price at which a share may be resold in two or three days or in two or three months, this is a question of guessing how the market (that is other parties) will assess the stock at that projected time. The investor attempts to *pre-empt* the image that others will have of his holdings in two days or in two

months. In an extreme case, a speculator buys a share because it is rising and sells it when it is falling. This is not investment, it is trade, and loss-making trade at that. As in commerce, psychology predominates. Changes in prices are more closely linked to changes in expectations than to performance *per se* and to the difference between market expectations and reality.

The German equity market for start-ups – the Nemax 50 index – went down by 93 percent in the 18 months following the tech bubble burst of March 2000. Is there any explanation? For starters, let's look back to the beginning of 2000. The stock markets had skyrocketed and yet the rise in prices had remained highly concentrated on the values of technology, telecom and media. The stock market gap between vanguard and standard sectors was getting greater and greater. A majority of commentators were persistently pessimistic; according to them trees do not reach the sky and the price levels attained by the new-technology stocks had nothing to do with the fundamentals. Normally, the more prices go into orbit, the fewer the number of investors who believe that they will keep on peaking. Nevertheless, even if the bears outnumbered the bulls, the price rises proceeded unabated.

We tend to forget that pessimists and optimists do not have the same impact. Let's describe an investor as someone who intervenes on the stock market as a buyer or a seller at a given point in time. We have already noted that any stock market transaction ascertains a disagreement between the buyer, who feels that the stock is worth more than its current price, and the seller, who feels that the stock he holds is worth less than its current price. Let's call optimists the intervening parties who think that it is undervalued. Let's characterize as pessimists those who would deem it overvalued. If the price is to rise there must be more buyers than sellers. The optimists have got to be more active than the pessimists. The former must carry more weight than the latter. This is often the case: for prices to rise, it suffices that the capital of the optimists exceed the capital not of all the pessimists, but only of the shareholders among them. If they are to sell, the pessimists must also be shareholders (this is true on the

spot market in general, but not on derivative markets; see Chapter 6). One tends to forget that the capital held by pessimistic shareholders has got to be at least equal to the capital held by all optimistic investors; if not, transactions are out of the question. This means that the percentage of pessimists must be substantial so that the capital emanating from pessimistic shareholders is quantitatively comparable to that originating from optimistic investors.

Suppose that among the investors in a new-technology stock called New Tech, half are persuaded that it will rise and half that it will fall. By investors we mean all those intervening in the market, whether or not they have a stake in this stock. Let's also suppose that half of the investors are New Tech shareholders whereas the other half aren't. So a quarter of the investors are New Tech shareholders and think that the stock price will decline, another quarter of the investors are likewise shareholders but think the contrary. A further quarter of the investors are non-shareholders expecting a rise; the fourth and final quarter is composed of non-shareholders forecasting a fall. Holding no shares and being pessimistically inclined, they will most likely sit on their hands. As for the first, remember that they are New Tech shareholders and deem the stock overpriced; quite naturally, they will be anxious to sell. They represent, let us repeat, 25 percent of the investors. As for the buyers, these optimists may be shareholders or non-shareholders; grouped together, they comprise 50 percent of the investors. If we define investors in terms of the amount of capital they manage, it would seem that 50 percent of the latter are buyers, whereas only 25 percent are sellers. Therefore the price of New Tech shares has got to go up.

Had the investors been polled, we would have learned that half were bearish and half were bullish, so the two halves would have cancelled each other out. We have nonetheless observed that because the pessimists carry less weight than the optimists, the price of the stock remains on the upswing. Even when bears outnumber bulls, stock prices still go up. If the price is to go down, there must be many more bears than bulls, not just a few.

Let's suppose that among the investors, 20 percent hold New Tech stock while the other 80 percent do not. If at least 16.66 of these investors are optimistic, prices will rise.[8] It is possible to demonstrate that the prices of new technology stocks will fall only if there are five times as many pessimists as optimists. Even if the former are four times more numerous, prices will continue to rise. What tends to happen when a stock is quoted for the first time? The fewer shareholders of new technology there are, the more pessimists it takes to bring it down. As start-ups such as those composing the Nemax 50 index are newly quoted, the percentage of trading shareholders remains low, and the prices of these recently introduced stocks normally go up even when there exist only a small percentage of optimistic traders and nearly everybody else is pessimistic.

With a penetration rate of 20 percent, we have observed that over 16 percent of the investors need to be optimistic if prices are to rise. With 10 percent penetration, a 9 percent optimism score keeps the price rising. Under such conditions we see how Nemax 50 companies, which at the outset of their career were unknown to most portfolios, will inevitably see their prices climb. Calculations show that it is enough for there to be approximately the same percentage of optimists among investors as the percentage of shares in the portfolios of interested investors for the price to rise. If the share represents just 1 percent of portfolios, it suffices that 1 percent of the investors believe in a price rise and the latter will materialize. But when the confidence index precipitately tumbles, this 1 percent just as suddenly vanishes into thin air and the price goes south.

Plummeting of the confidence index is bound to provoke the steepest falls in prices for the least widely held shares. One can understand why Nemax 50 lost 93 percent in 18 months. One also sees how it was that in September 2001, small cap shares were smashed to smithereens on the NASDAQ. The Conference Board's monthly report revealed the fact that from September 1 through 18, consumer confidence underwent its biggest fall since October 1990, when American troops were heading towards the Persian Gulf.

What may be deduced from this regarding the impact of fluctuating levels of confidence on the stock market? Even if consumer confidence differs in some ways from investor confidence, it should function as a creditable proxy. After all, in the US alone, no fewer than 84 million individuals own stocks either directly or through mutual funds. Just read the following:

> America's long bull market over two decades was accompanied by broadening public participation. During the final, manic stage of the boom, Internet-based stockbrokers were the conduit for small investors deluded into believing that there was money to be made in frequent trading, often by the day. For most of the stock market's rise, however, mutual funds were the vehicle carrying the investing public to the party. In 1980, according to the Investment Company Institute, fewer than 6 percent of American households had money in a mutual fund: when they had, the great bulk was in bond or money-market funds, not in equities. Last year (i.e. in 1999), more than half of all households had invested in mutual funds with investments in equities making up more than 70 percent of mutual fund assets.[9]

Then again, how is the consumer confidence index to be properly measured? The number of pessimistic responses is subtracted from the number of optimistic responses. As for the stock market, the truly vital confidence index should be the difference in degree between optimistic investors and pessimistic shareholding investors. In the US, the predominance of stocks in investment funds is such that this difference does not amount to a great deal. Continental Europe is another story entirely. At the end of September 2001, only 11.7 percent of French funds were invested in French stocks (as compared with 15.8 percent in foreign stocks, 9.5 percent in French bonds, 2.9 percent in foreign bonds and 42 percent in monetary funds). Such figures shed light on a low level of optimism pertaining to stocks. Yet, stock prices could rise with a low level of optimism given the paucity of stock ownership. But it also

entails that even a moderate lowering of the confidence index could lead to a pronounced lowering of prices in the French market. The same applies to Germany, among other European markets.

Fundamental value and price fluctuations

According to economic theory, investors focus on the ability of firms to generate profits. There should exist a price designated as *fundamental*. Economists term fundamental the economic figures on which this basic price hinges: company production and sales, its management, the state of the competition, technologies, the evolution of demand, economic growth and so on. The very notion of fundamentals presupposes the existence of mechanisms that make the market price gravitate towards this fundamental price. I have already castigated the economics that depicts the stock exchange as similar to goods markets. On the latter buyers decide with prices in mind: when the price rises demand falls if there are other products presenting the same usefulness at a lower price. Supply grows if the price exceeds production costs. Lower demand and reduced supply tug market prices back to the fundamental value, that is production costs supplemented by a "normal" profit margin.

This distinctive attribute of goods markets was discovered in 1870 by the great French economist Léon Walras; it is known as the law of supply and demand. Goods and services are not endowed with inherent or intrinsic value. The latter hinges on the subjective appreciation of the buyer; beauty is in the eye of the beholder and available quantities – relative scarcity and potential expensiveness – have got to be taken appropriately into account. Trading of goods and services is effected on a market. A market is comprised of a complex of buyers and sellers who interact to determine the prices and/or quantities of a given product. The trade-off is translated into a price that goes up as the commodity grows scarcer. Rarity means expensiveness.

So it goes, say economists, for the stock market. Higher prices are likely to lead investors to prefer other stocks; in that way demand may go down. When the price rises, demand sinks. On the other hand, this rise is said to stimulate an inflow of sales. When the price rises, supply goes upwards. Up to what point? Up to the fundamental value. Once the price has surpassed the fundamental value, sales ensue and mechanically bring the former back to the latter. Once the price has sunk below the fundamental value, purchases ensue and engender the same equally mechanical effects. According to this concept, the market price fluctuates around the fundamental value, which is meant to function as a reflection of all available information. In *rational expectation theory*, new information pertaining to the fundamentals is likely to lead investors to amend their analyses of fundamental value and consequently to modify the price of a financial asset. This price would thenceforth correspond to the fundamental value, whose fluctuations would likewise have to do with the arrival of the latest news. But don't prices fluctuate too suddenly and too much to be explainable in terms of mere adjustments of the fundamentals?

From the economist's point of view, a price continually set far from the fundamental value is evidence of a speculative bubble. This is utter nonsense! In reality, as we have observed, this way of envisioning stock market mechanics does not hold water. It presupposes that investors are aware of the variance between the market price and the fundamental price, and that they all share the same assessment of the latter. We have seen that this is by no means the case. The theory is totally illogical; it postulates as an underpinning of the market process the permanent existence of a gap separating the real price from its so-called fundamentals. But what is the cause of this gap? God only knows! What happens when it has disappeared; isn't such a question the very object of the theory? The answer is that when the deviation between the market price and the fundamental value has disappeared, prices have likewise made their way to the exits. Since price is tantamount to fundamental, the sellers have gone into hibernation, and so have the buyers.

One cannot possibly understand through which byways the theories of the fundamentals and of rational expectations can explain the everlasting ups and down of financial asset prices. What may be possible, on the other hand, is that numerous investors intervening day in and day out on the market all have their own ideas about fundamental value. So do parties who refrain from investing. The various market prices might consequently reflect confrontations over the course of time of these multiplicative fundamentals. One can understand how prices may come together with an average of fundamental values. It is too bad if this works out only in the long run and does so in terms of portfolio averages. It proves to be true only by dint of the diversification of numerous financial assets and over the course of time. Only when the conditions of the "central limit theorem" are applied do returns on a portfolio analyzed in the long haul come together with the fundamentals.

Let us try to identify and understand the finite number of investors who really affect the movement of a company's share price. If transactions are to take place, the expectations of the buyers must differ from those of the sellers. The market price is the result of disagreement between buyers and sellers. The buyers believe that prices will rise, but they do not agree on how much or at what moment. Their investment horizons differ. Many sellers are persuaded that prices will go down; as to when and to what extent, they do not agree either. A market is predicated on the persistence of such disagreement. And yet we do not need the hypothesis of an agreement of the buyers (or the sellers) among each other. Neither do we need an agreement of traders concerning that much vaunted fundamental value. At any given time, prices evolve in such as a way as to render selling interests and buying interests altogether equal. While the market is open – at any given time – there are investors, both buyers and sellers, who stand ready to intervene.

It is self-evident but paramount that sellers are shareholders who reduce their holdings. They are all stockholders, every single one of them,[10] since to sell stock on the spot market you must first have it in your hands. However, buyers are not necessarily shareholders. Some are

and may reinforce their positions; others are not and will turn into stockholders when they do buy. Therefore on the market at any time there are more stockholders selling than stockholders buying, and this is always the case when non-stockholding investors intervene as buyers. Only exceptionally may there exist as much capital emanating from stockholders selling as from stockholders buying. But there cannot possibly be *less* capital emanating from stockholders selling than from stockholders buying. At any moment there is a price resulting from the confrontation of purchases and sales; by their very definition, purchases equal sales at this market price. Half of all transactions are purchases; the other half are sales. If 30 percent of the transactions originate with stockholders who reinforce their position, 20 percent of the transactions are performed by non-stockholders who buy. Stockholders who sell represent 50 percent of the transactions, and among stockholders the sellers outnumbered the buyers.

At any moment the new savings invested in a stock by non-stockholders are equal to the sales net of purchases effected by shareholders who intervene on the market. The capital invested by sellers on the market is at any moment equal to the capital invested by buyers. But then again – and this is fundamental – the value of sales is obligatorily at least equal to, or larger than, the capital invested by buyers who were previously shareholders; it can never be less than the capital invested by stockholders wishing to reinforce their position. Capital invested in purchases by shareholders is at most equal to capital divested by shareholders and never greater. The capital of previously shareholding buyers can at no times exceed those of the sellers (who by definition are already shareholders).

The number of investors willing to trade on the market is composed of a number of shareholders (S) and also of non-shareholders (NS). If we define the percentage of buyers as b percent of all investors, then the number of purchasing investors is equal to $b\% \times (S + NS)$. This percentage of investors decided to buy remains the same for all investors ready to intervene on the market, whether or not they are

shareholders. The number of traders selling is equal to the percentage of shareholders decided to sell, s%S. Finally, if we assume that buyers purchase on average Nb shares and sellers sell Ns, we should be in a position to postulate: $b\% \times (S + NS) \times Nb = s\%S \times Ns$. There is no reason to think that the average number of shares Nb bought by one purchaser should be different from the average number of shares Ns sold by one seller. Then $b\% \times (S + NS) = s\%S$ or else $b\%NS = (s\% - b\%)S$. In plain English, a small percentage of buying interest applied to a broad universe of new investing capital equals a much larger percentage of selling interest applied to a smaller universe of existing shareholders. A very small change in the percentage of buying interest has a large impact on stock prices as it applies to a broader universe than a large change in the percentage of selling interest. In turn, these changes are linked to the variation of optimism and pessimism to explain the sudden fluctuations of intraday stock prices. However these flows of funds play a lesser role the further one looks in the future.

Speculative value

The speculative approach corresponds to a one-to-three-year investment horizon. Generally speaking, this is the forecasting range employed by financial analysts. When you strive to predict prices for a stock over a period of two or three years, you are also trying to foresee how the market will analyze company growth prospects and how the market will have integrated the evolution of economic facts at the time when one wishes to sell. This presupposes forecasts of three-year results and of the price/earnings ratio at the future time of sale. Last but not least, one must not neglect the role of fashion in the field of investment. Which sectors and investment stories will be trendy at the time of resale?

One of the keys to short-term analysis is the ability to identify a company whose growth prospects have yet to be recognized, so that its current price/earnings ratio is not too high. It is expected that the

company will nonetheless have succeeded in enhancing its forecasted results at time of resale and managed to convince the market that its future growth will be even more intense. With results much better than expected and a high price/earnings ratio justified by strong growth prospects, the price at resale time ought to be doubly boosted.

The problem here is that when predicting company growth, financial analysts display the flimsiest of track records. In *A Random Walk Down Wall Street*, Burton Malkiel describes a study that he conducted with John Gragg dealing with company result forecasts performed by financial analysts for a range of one to five years.[11] Comparison with actual growth proves them woefully wrong. Quite often, five-year growth prospects would be more adequately analyzed through use of long-term GNP growth forecasts than when giving credence to those of the analysts. One-year predictions were even less trustworthy. Not a single analyst stood out in a noteworthy way. That said, poor forecasting is part and parcel of the human condition, yet we keep on attempting to predict.

Choosing the winner is a risky proposition, although we are not altogether clueless. The best companies must not go out on a limb for a single product or a risk-laden strategy. They must justify strong growth prospects pertaining to their main products and they have to be headed by bosses able to explain how they create value.

Beware of fashions and fads. As we discussed earlier, one of the defining events of 2000 was the upsurge in technological values. Such a rare event was visible in the three main financial regions, as much in Europe and Japan as in the US. The new-technology theme had been launched. Of course there were excesses; investors were hard put to determine which stocks would remain safe bets, and they often bought into technologically related securities without discernment. As a result, the very high prices of some turned out to be unjustifiable. The objective should be to identify the fads to come, not what is fashionable today.

The other theme to focus on is mergers and acquisitions. Some highly fragmented sectors may experience integration that sustains asset

values. That said, it is important to be selective as regards future mergers; such operations are not invariably crowned with success (to say the least; see Chapter 8). But then again, some mergers bring about sizable gains in productivity. They help to explain the commendable overall results achieved in the sectors involved. Globalization fuels the acceleration of cross-border mergers; once completed on a nationwide scale, restructuring is propagated from one country to another. This movement has grown increasingly clear in the euro zone after the common currency came into being.

There are two ways of drawing inspiration from the theme of mergers and acquisitions. The first option consists in investing in a potential target and hoping to amass substantial capital gains once an operation aimed at the target is launched. Mergers are much more beneficial to the target company than to the acquirer. The second option consists in investing in the buyer in such a way as to benefit from the savings generated by the merger. The Achilles heel is that not all mergers are marriages made in heaven. Only one in two creates true value for the shareholder of the acquiring company. However, a firm doing business in a distinctively fragmented sector may indeed stand to draw profit from a takeover bid.

The two or three-year price of the stock is the other element of value in the analysis of short-term returns. Future price hinges on the price/earnings ratio of the share, a ratio that is itself contingent on the overall market price/earnings level and its rating, the market standard for value. Last but not least, the resale price also depends on the company growth prospects at a precise point in time.

If the investor is persuaded that his earnings will be considerably higher in the future, he is ready to pay for the stock at a higher p/e ratio. That said, growth does not last forever; its duration affects the p/e. Finally, the level of the price/earnings ratio should reflect the expected growth in earnings in both degree and duration.

Let us summarize. The price/earnings ratio is the share price divided by earnings per share. Earnings per share are current earnings divided by

the number of shares held by a company. If investors are convinced that companies will be able to achieve sustainable growth, they will pay dearly for the current earnings. During the bull market of the late 1990s, they indeed believed that growing companies could generate high investment returns and were consequently entitled to an extremely high p/e. In 1980 the price/earnings multiple on the S&P index was only 7, but by 1999 it had skyrocketed to 36. Even when, just after the September 11 terrorist attacks, the S&P index hit a three-year low, the average p/e ratio was 28 and thereby remained high by the standard of time (the 20-year average p/e ratio was 18.5, 13 over recession troughs). At the end of 2001 the p/e ratio still approximated 30, price falls having been matched by earning per share tumbles. It was certainly difficult at the time to justify investing in stocks exhibiting such a high p/e ratio if the objective was to sell them back three years later at a profit.

Another questionable aspect of p/e ratios is uncertainty concerning the "e", the earnings that underpin share valuations. This is thanks to a number of one-time write-offs, among other forms of accountancy sleight of hand. Witness the bankruptcy of Enron at the end of 2001 (see Chapter 6). Flaws in the calculation of earnings may render profits difficult to gauge. Other, more sophisticated ratios exist to measure earnings: price-to-EBITDA (earnings before interest, tax, depreciation and amortization) and price-to-cash flow, for example. They perform more adeptly in so far as they measure profit in a way that, ideally, is more closely linked to a given company's underlying results. But they cannot provide meaningful results if the accounting standards countenance trickery in determining profits.

How is it possible to determine whether or not the market p/e has enough freedom to rise before the time has come to sell one's stock? In the 1990s Alan Greenspan, Chairman of the Federal Reserve System, popularized the idea of an "earnings yield ratio", which compares government bonds with an implicit earnings "yield" (in fact, the inverse of the p/e ratio) to shareholders. Up until 1995, this earnings yield on shares had moved rather closely in line with yields on government bonds.

The earnings yield ratio had the virtue of comparing shares with a risk-free asset. It was on the basis of this ratio that in 1996, Greenspan famously suggested that the US stock market might be reflecting some form of irrational exuberance. These last two words also constituted the title of a celebrated book by Robert Schiller. In 1999, the NASDAQ registered the best year ever for a major index, finishing at 4069 (up 85.6 percent). The Dow closed at 11,497 (up 25.2 percent). It was only in 2000, four years after Greenspan's pronouncement, that a major market turndown occurred. Even a stopped watch gives the correct time twice every 24 hours!

Investors who are able to predict market p/e are those who liquidate their portfolios when the p/e is high and return to the market when it is low; on Wall Street they are known as *market timers*. Malkiel compares the investment of US mutual fund shares with the S&P 500 index.[12] His study shows that fund managers had made cash investments when prices were at their lowest. Had they known better, they might well have invested in equities. They had made stock investments when prices were at their highest, when they should have been into cash. Malkiel's conclusion is that market timing is inherently problematical. As regards the evolution of the p/e ratio, foresight is hardly an exact science.

That said, the game is worth the candle; there are always many who take the risk. Over nearly 12 years (January 1987 – October 1998), annual returns on US shares averaged 12.8 percent. For an investor who had missed out in the best 40 days of rises over these years (fewer than 2 percent of the stock exchange sessions), annual returns would have amounted to just 1.5 percent. Had he steered clear of the *worst* 40 days, he would have earned 29.5 percent per year. Had he simply avoided the 40 best and the 40 worst days, his returns would have amounted to 16.5 percent.[13] The performance is at the extremes, but there is no evidence that an investor who proposes to play on near-term fluctuations comes out winning.

6

The derivatives markets

At the beginning of 2000, Enron was the largest energy broker in the entire world. By the end of 2001, Enron had devolved into the largest bankruptcy case in the entire history of the US. Simply a large pipeline operator in the 1980s, this group had profited from deregulation of the energy market and invented trading in energy-related products. No fewer than a quarter of the transactions effected in America in electricity, gas and fuel went through Enron, which had created a sort of web-based exchange market (EnronOnline) allowing economic actors – producers, consumers, dealers – to buy and sell energy wholesale. Trading on this unregulated market amounted to several billion dollars a day and was largely based on derivatives.[1]

Enron's basic strategy consisted in opening and maintaining spot and derivatives markets for an array of assets ranging from electrons to advertising space, not forgetting credit derivatives, instruments that allow lenders to pass on to others the risk that borrowers will default – for a fee.

More generally speaking, derivatives markets are those in which price risks are exchanged and hedged. Such trade is effected through transactions on derivative products. These products have no intrinsic value and their prices derive their value from some other financial asset; that is an explanation for their name. Such markets are comprised of futures, options and over the counter (OTC), which are described in this chapter. Futures facilitate long/short positioning. Options cover

asymmetrical risks. Swaps provide for payments when prices diverge. These markets allow for the coverage of manifold risks, which are transferred from those whose profession doesn't to those whose profession does consist in taking them on.

Historically, the risks covered had to do with commodity prices; for quite a while, these were the only ones. Futures and options on raw materials have a long track record: they enable farmers and industrialists to guarantee prices for their products. Since the mid-1970s, derivatives markets have allowed financial professionals to shelter themselves from the risks of interest rate fluctuations and put investors and portfolio managers in a position to limit the variability of stock market prices and indexes. I am flabbergasted by the ingeniousness of financiers who have not hesitated to propose futures contracts or options on interest rates, exchange indexes, natural gas, non-storable products such as electricity, insurance risks etc. It is even possible to take precautions against dangers associated with temperature. In a recent development, some insurance companies have taken to offering catastrophe bonds, whose returns and redemption value are determined by the ongoing evolution of earthquakes, hurricanes, tornadoes and other disasters that affect their profits. The activity of these derivatives is increasingly self-sustained; when banks propose a new coverage instrument, they take on the risk at their own expense and evidently endeavor to cover it – with other derivative instruments.

Two categories of derivatives markets exist. The first are endowed with a clearinghouse; they are organized markets. On organized markets, the clearinghouse replaces the buyer and seller and functions as their one and only counterpart. As a result, the role of the clearinghouse is to guarantee market transactions and ensure that they come to a satisfactory conclusion. The clearinghouse asks each of the contracting parties to provide margin cover protecting it from the risks of default of the buyer or seller. It also proceeds with margin calls in the event that prices evolve unfavorably.

Professionals who had acquired satisfactory mastery of the products negotiated on stock exchanges equipped with a clearinghouse wanted to remedy the drawbacks of these markets (industrial-scale measurement) while preserving the main advantages (coverage against counterparty risks). They addressed themselves to the banks to obtain personalized, "made-to-order" risk management. This helps to explain the rise since 1985 of over-the-counter (OTC) markets. On the OTC markets there is theoretically no margin cover, no such thing as a margin call. The reason is that the buyer and the seller are face to face, with an equally direct risk of non-performance. On the OTC markets the organizers are generally banks and brokers such as Enron, while on the organized markets contracts are standardized. One advantage of OTC markets is that they tailor contracts to the needs of the contracting parties, who engage in one-on-one negotiations to obtain a "made-to-order" result. In 2000 the OTC markets registered transaction volumes much higher than those of the organized markets. It is also by no means exceptional for a product invented by a bank to be imitated, generalized and finally negotiated on an organized market.

Futures and forward contracts

Futures and forward contracts oblige the parties involved to deliver or have delivered a given quantity of basic assets at an agreed price and on a precise date. *Futures* are standardized contracts duly negotiated on a regulated market. An investor may purchase a futures contract at the day's price; it is guaranteed by a payment. In practice, it is often stated that the purchaser of a futures contract has a long position or that the contract itself is *long*. Symmetrically, the seller's position (or contract) is *short*. *Forwards* are like futures contracts, but they are negotiated over the counter and the contractual specifications are freely agreed by the parties concerned. In contrast to forwards that conclude with actual delivery, the originality of futures consists in the projection of

two possible outcomes: actual delivery (rarely) or offset of the original transaction (more often than not).

The traditional way of acquiring goods consists in purchasing them by cash collected on delivery. The futures contract is an alternative way of acquiring or selling goods, on a deferred basis (in the future). Futures are standardized contracts for forward delivery. The buying and selling take place in a centralized marketplace, an exchange. Forward contracts are agreements directly entered into between a buyer and a seller, calling for delivery of a specified amount of a specified asset at a specified future date. The buyer and the seller are direct contractual counterparties to one another. Buying or selling forward consists in agreeing immediately on price and article; delivery and reception are slated for later. The contracting parties agree today on a time or term price. On the due date, the buyer is obliged to take the delivery and to settle as stipulated. The seller is compelled to deliver the goods. For all assets there consequently exist three prices: the spot price, the futures price and the forward price. In fact there exist multitudinous futures prices; they are just as numerous as possible dates of delivery. Futures prices are prices for delivery in three months, six months, nine months, one year etc. To a certain extent they reflect anticipations of cash prices as of these due dates.

Ever since the High Middle Ages, we have conducted transactions scheduling deferred delivery of the negotiated goods (or assets). Merchants purchase standing crops. The harvest has yet to be performed; it is in the future, but the dealer and the farmer agree now on a price for later, when the former will take the goods away:

> The agents of these private markets are often large-scale hawkers or peddlers, they even go into farm kitchens so as to effect advance purchases of wheat, barley, sheep, wool, rabbit and sheepskins. They also at times intermediate in many ways, as ready to deliver the barley to Dutch brewers as to buy in the Baltic countries some rye demanded in Bristol.[2]

Braudel likewise mentions the Segovian stockbreeder who, in the sixteenth century, sold the wool of his sheep to Genoese merchants prior to shearing. By doing so, the herdsman guaranteed his revenues and transferred the risk of wool price volatility to the Genoese dealers; it was up to them to engage in risk management. The problem posed in such transactions has to do with credit for the other side and the actual worth of the purchased assets. Will the peasant be able to deliver the goods or won't he? And if the harvest is a failure, it is the buyer who pays the price.

Over-the-counter transactions entail an evident counterparty risk. Futures contracts quoted on regulated markets involve no such hazard. They eliminate "delivery risk", that is to say the risk of default on the part of one of the contracting parties; such risk is inherent to forward contracts.

Raw materials, currency and fixed-income securities have long since served as supports for contracts negotiated on derivatives markets; this remains the case. The tradesmen who met at the Antwerp Exchange at the beginning of the sixteenth century bargained over merchandise that provided the object of a contract in which the seller committed himself to delivering the goods to the buyer on a specified date, at a precise place and for an agreed price.

The first futures market was in Chicago around 1860 and dealt in cereals. Following that, tropical products were introduced; they included sugar, coffee and cocoa on markets located in New York, London and Le Havre. Soya products made their initial appearance in Chicago a few years before the Second World War. An exceedingly large number of raw materials were negotiated in the commodity markets. And today, products ranging from orange juice to frozen shrimp are the objects of future quotations.

For raw materials – this is equally the case in all futures markets, whatever may be the underlying assets – the creation of futures contracts coincides with periods of pronounced fluctuation in prices. By locking future prices, such markets allow for risk limitation. For example, it was at the time of the second "oil shock" (November

1978–March 1983) that a market for crude oil futures was opened on the New York Mercantile Exchange. Ever since, the latter has specialized in energy products; in 1990 a natural gas market came into being; in 1996 two futures markets in electricity also saw the light of day.

The first futures markets for currencies began in 1972 at the Chicago Mercantile Exchange (CME) just after the abandonment of the gold standard. The contracts were all quoted in US dollars and at first had to do with virtually every major international currency. Today's most active contracts have as underlying assets the euro, the yen, the Swiss franc, the Canadian dollar and the pound sterling. However, it is the interbank forward that is the real thing for currencies.

The first futures markets for interest rates opened at the end of 1975, once again in Chicago, during a period of high inflation that had a strong impact on interest rates. Nevertheless the true takeoff of interest rate futures dates from the opening in 1977 and 1981 of what were to become the world's two most important financial markets, that for futures contracts on US Treasury bonds at the Chicago Board of Trade (CBOT) and that for 90-day Eurodollar deposits at the Chicago Mercantile Exchange (CME). The success of these contracts allowed this innovation to spin off to all the other international financial centers. Over 50 contracts supported by fixed-income financial securities were introduced in the United States, but only these two markets now function satisfactorily.[3]

Stocks futures first came into being at the start of the 1980s. The idea of a futures contract on a market index had been elaborated in 1977, but it saw the light of day only five years later; this was due to statutory and judicial roadblocks raised by regulatory organs and to overall reluctance to adopt such a revolutionary instrument.

The first futures market based on an index, that is an intangible asset, was opened at the Kansas City Board of Trade in 1982. The underlying asset of these contracts was the Value Line Average index. Two months later, the Chicago Mercantile Exchange went on to introduce a contract on the S&P 500 index that was rapidly to dominate this segment of the derivatives industry. Afterwards, many other markets to do with stock

exchange indexes were opened in the US, only to collapse in the October 1987 crash. Before this crisis, transactions in index futures contracts, as measured by the volume of underlying stocks, represented from 150 to 200 percent of all transactions on the spot market of the New York Stock Exchange.[4] Only 10 years later did transactions recover the level of 1986. Yet it remains the case that the size of open positions has grown a great deal, which means that this market is utilized more and more often by professional traders. Following the events in 1987, stock index futures were introduced in numerous exchanges outside the US. All told, activity on these markets, which steered clear of that crisis, has been superior to that of its US equivalents.

Stock index futures allow for investment in a stock portfolio for a relatively low amount of capital. An investor can purchase a stock index futures at today's price, secured by a small margin payment. Transaction costs are lower than those of direct investment in the securities. Stock index contracts enable investors to cover their portfolios by selling futures contracts short when they wish to reduce their exposure without thereby incurring the costs of a cash sale transaction. And the other way around? Investors may position themselves on a market in anticipation of a selective and progressive purchasing schedule. Even if prices rise before the end of buying, the investor will benefit from this increase thanks to long-term positioning in stock index futures.

When you buy a contract you do not pay for it before the due date; the purchase of a contract is a promise to buy in three, six or nine months at a price set today. To ensure that each party respects its commitments, the risk is covered by an initial margin that the clearinghouse requires from the buyer and the seller. The amount of this margin hinges on price volatility and consequently on incurred risk; it corresponds to a percentage (from 1 to 10 percent in general) of the underlying asset. Throughout the duration of the contract, the gains and losses resulting from fluctuation of the underlying asset price are calculated by means of the *mark to market* procedure.[5] If losses reduce the guarantee offer by the initial margin by more than, say, 20 percent, a margin call will be

addressed to the seller or the buyer. If, for example, the buyer has bought a product at 15 and the price declines to 10, his prospective loss is 5. He will be "margin called" at 5 in such a way that his account always covers the potential loss. In the event that the customer fails to effect payments, his position is liquidated and the guarantee (or initial margin) serves to settle the loss. As a result, default is virtually eliminated. Because the initial margin is the only capital required for market investment, a futures contract benefits in comparison with a cash transaction from a leverage effect.[6] If a contract at 15 is valued at 20 two months later, there is a gain of 5 for an investment of 0.15 (the amount of the initial margin). The leverage effect of futures contracts allows the speculator to make the most of an opportunity for profit (or for loss, as we shall see later with the example of LTCM) and also enables the professional to cover his risk at the lowest cost.

Any bought or sold contract is settled by the due date at the latest. The seller of a 12-month contract commits himself to delivering in 12 months an underlying asset to whomever has bought the contract, at a price that is set today. The buyer may have to take delivery of the underlying asset within 12 months at this price. However, up to the delivery date, the seller may repurchase the contract and the purchaser may resell it. In futures markets, buy orders are confronted with sell orders to determine a price for these contracts up until the date of payment. At settlement time,[7] the contracts are worth the same price as spot contracts on the same day.

Let's take a futures contract that was worth 110. Suppose that at the last trading day, the market price for the underlying asset is 90. The buyer may resell this asset at 90 and for each contract he will lose 20. The seller must deliver the asset at the projected price of 110. If he possesses this asset, he will proceed with delivery. If not, he will buy it on the market at 90 and thereby earn 20 for each contract.

The apparently most simple manner of bringing things to a close would be fulfillment of contractual obligations through delivery of the underlying asset. In fact, this method is seldom put into practice. In

almost all cases, a futures contract is brought to an end with an equal and opposite transaction. How is this done? The trader who is short (whose net position in the futures market shows an excess of sales over purchases) buys an identical number of opposite contracts for the same delivery month. In the same way, the trader who is long (holding a position that obligates him to take delivery) buys for the same due date an equal number of short contracts. This method of settlement is the most original characteristic of futures markets. It is made possible by the existence of a clearinghouse enabling the trader to pay out or collect the difference between the prices of the two transactions without having to intervene on the spot market. On the OTC market the conclusion is most often effected by delivery or cash settlement; for each contract, the buyer delivers the underlying or the cash value of the underlying to the seller.

Fundamentally, futures contracts allow traders who use them to keep price risks at bay. Let's take as an example a refinery. What does the refiner fear? The price of crude oil may rise; it cannot necessarily be passed along to the price of refined products. The refiner notes that while the spot price is 20, that in three months is 21. And while production is profitable at 21, this would no longer be the case at 30. Wishing to shield himself from such risk, the refiner buys futures contracts and is thereby enabled, as of today, to set the purchase price of the crude oil he will use in the near future. He will buy three-month contracts corresponding to a price of 21 per barrel. He may close his long position in two months' time. He thereby guarantees for himself a cost of 21 in two months and covers the risk of an increase. If by the payment date the spot price has gone up to 30, the contracts he had bought at 21 will be worth 30 and he will sell them at that price, thereby making a gain of 9 on each contract. His costs will come to 21, which is the purchase of the crude oil at 30, minus the gain on the futures market of 9.

That said, such coverage has a cost; it entails a loss of opportunity. Suppose that three months later crude oil is quoted at 15. In that case, the refiner will bear a refining cost higher than that of the market; he

will buy his oil at 15, but he will also sell his contracts at 15 and will consequently lose 6 on each contract, thereby raising his total cost to 21. The refiner does not fear a crude oil price rise alone; he may also, at other moments, anticipate lower prices for refined products (gasoline, fuel, kerosene) that he has in stock or will produce at some time in the future. To hedge against this decrease, the refiner must sell petroleum product futures, contracts for fuel or gasoline; he may thereby set, as of now, the selling prices for products that have perhaps yet to be refined.

What is true for the refiner is equally the case for many other industrialists, manufacturers or tradespeople. Generally speaking, all economic actors fearful of a drop in the price of the goods they make or keep in stock will have a tendency to sell futures contracts (we may also speak of *short hedging*). The principle of protection against price fluctuations consists in taking positions on the futures market opposite to those one has on the physical market. In terms of the goods they produce, these actors are long. When engaged on a long-term basis, one runs the risk of a price decline. This risk is covered through a short position on the futures market; one sells something one does not possess. On the other hand, all actors who fear a rise in the prices of the goods they use in the framework of their economic activity – and who are materially short – will have a tendency to *buy* futures contracts and take a long position on the futures market.

What is true for the price fluctuations of raw materials is equally the case for interest rates. A company that is planning in six months to issue bonds or commercial paper and foresees a hike in interest rates is legitimately inclined to protect itself. It will do by selling futures contracts for six months' time, when the bond issue is to be launched.[8]

What is true for the prices of raw materials and for interest rate fluctuations is equally the case for the prices of stocks in the form of an index. A perfectly diversified investor must reproduce in his portfolio the structure and composition of the index representative of the stock market in which he invests (Euro Stoxx in Europe, the S&P 500 in New

York, Hang Seng in Hong Kong etc.). Such diversification shields him from diversifiable risks but does not shelter him from the risk of overall price fluctuations, in this case a drop in the market index. Wanting to avert or sidestep this market risk, a portfolio manager has to sell stock index futures contracts, and thereby protect the value of his portfolio. In the same way, a pension fund foreseeing a stock exchange rise may perhaps not dispose immediately of funds to invest. Thanks to the purchase of stock index futures, it will be in a position to secure, as of now, the prices of the shares that in any event it will have to buy in the near future.

Let's return to the case of the refiner who lives in fear of a rise in the price of crude oil. Wishing to hedge against this risk, he buys futures contracts. Who will sell them to him? Quite probably fellow professionals, such as manufacturers or industrialists who own a stock of crude oil and want to protect themselves through the *sale* of contracts. Herein resides the beauty of a futures market. It brings together at a precise time traders with differing anticipations of upcoming price evolution and who act accordingly. These are speculators who foresee the future and act before it transpires. Buying and selling futures enables one and all to predetermine prices so that they are not affected by the risks of rises and falls. What is true for commodity futures is likewise the case for interest rate futures and stock index futures.

The supply and demand of contracts for purposes of coverage cannot in all likelihood be equal. It is statistically impossible that at a given moment there exist exactly the same number of professionals wishing to protect themselves from an oil price hike and professionals wishing to shield themselves from the opposite. This explains the intervention of "mirror speculators" who underwrite the residual risk (of which the professionals cannot take care). The primary interest of such a speculator is to make a short-term profit over a period of a few months. He has no interest in the production or processing of a commodity. It is difficult to establish the exact percentage of transactions assumed by actors who cover their commercial operations and by operators who intervene in

speculation. Yet these much-maligned speculators in fact play a positive role, which is basically that of an insurer providing coverage for the commercial operations of a market actor.

Finally, more than half of transactions are an expression of arbitrage activities. Arbitrage is the simultaneous purchase of one commodity against the sale of another in order to profit from price distortions. Index arbitrage is the simultaneous purchase (sale) of stock index futures and the sale (purchase) of some or all of the component stocks that make up the particular stock index to profit from sufficiently large intermarket spreads between the futures contract and the index itself.

Unlike speculators, arbitrageurs do not bet on where the market is heading and they always reason in terms of relative value: they buy one product and sell another, thereby mutualizing their risks on numerous operations.

Futures markets consequently allow for redistribution of the risks that the professionals do not wish to incur; other operators agree to underwrite them. The latter are in a better position to do so: they have less apprehension of risk or a different perception of the future. Speculators buy a risk of which industrialists wish to be rid.

A speculator is receptive to everything to which the market is liable to react on a highly short-term basis. "The facts are unimportant! It's what they are perceived to be that determines the course of events."[9] This basic statement does not hold for the industrialist. Without speculators, the latter would be unable to cover price risk. The futures market allows for speculation on rises (for the buyers who go long) and on falls (for the sellers who go short) of an underlying asset. Prior to development of these markets, those speculating on a rise bought underlying assets; those speculating on a fall had to borrow these assets and buy them back on due date to pay back the initial lender. This system of lending and borrowing still exists and helps to finance positions on the futures market. LTCM used it as a means of financing that grew excessive, as we are about to see.

LTCM

In a sort of "close encounter with Chapter 11", the history of Long-Term Capital Management (LTCM) is illustrative of the risk of leverage or borrowing. LTCM was a hedge fund applying a market-neutral strategy that in theory entailed little risk. LTCM endeavored to draw profit, as would an arbitrageur, from price differences between closely correlated assets. For example, it held long positions in high-risk, high-yield bonds such as the debts of emerging countries, and short positions in those of higher quality and lower yield (such as US Treasury bonds). The prices for these positions evolved in principle in a parallel manner; as a result, LTCM investments were supposed to escape interest rate movements and theoretically present only minimal risk. In fact, this hedge fund was just barely bailed out in September 1998; had it actually gone bankrupt, it might well have thrown the world financial markets into chaos.

LTCM had invested over 25 times its capital of $4.1 billion in various assets, including government bonds, Russian bonds, mortgage-backed securities and selected US equities. Leverage was extremely high in order to amplify the low returns on theoretically low-risk arbitrage operations. Moreover, LTCM was quite active on the derivatives markets with over $1.25 trillion of notional value. These could be coverage positions meant to reduce risks or speculative positions for taking risks, without it being possible for an outside observer to distinguish one from another. There were more than 50 LTCM counterparties on the over-the-counter markets, where the world's leading financial institutions were to be found. LTCM was also widely present on the organized markets. It represented a sizable percentage of the positions opened on a dozen futures markets. Each organized market and each counterparty was evidently aware of the status of its contracts with LTCM, but no contracting party was cognizant of the consolidated status of LTCM's commitments towards the others. The large-scale financial establishments that worked with LTCM on the over-the-counter markets had guarantees providing them with necessary security; at least that is what they thought.

The models employed by LTCM could not foresee what was at the time unforeseeable, that is the suddenly appearing divergences between the prices of financial instruments, prices that had historically varied in a parallel manner. The avalanche swallowed up chalets that, as far back as could be recollected, had appeared invulnerable. Prices were no longer submitted to traditional logic – neither was the snow! At the end of summer 1998, the fall of the rouble and the near cessation of payments by Russia panicked investors, most notably those who had invested in Russian government short-term bonds, GKOs. The contagion then spread to the other emerging countries and shortly later to the stock markets of the developed countries. The flight towards quality and security reduced to next to nothing the value of high-risk bonds in which LTCM was long and, at the same time, led to a rise in the prices of low-risk bonds in which LTCM had short positions. The leverage of 25 to 1 correspondingly amplified the losses and LTCM found itself obliged to sell off its high-risk long positions. These sell-offs correspondingly amplified the price fall of the high-risk bonds, rendered even more pronounced the price variances between high-risk and low-risk bonds, and made the potential losses of LTCM and the margin calls even greater.

By mid-August the losses had grown staggering and LTCM had to seek out equity capital. It did so, but to no avail. By the end of August, following a loss of $1.18 billion over the month, LTCM was left with a capital of just $2.3 billion with assets of $125 billion, that is leverage of 50 to 1. By mid-September its capital had melted down to $600 million and its assets still "weighed" $100 billion. Leverage had skyrocketed to 150 to 1.

If LTCM had been left to its own devices, thus unable to fulfill its commitments, it would have gone into liquidation; this is known as Chapter 11 bankruptcy. All its counterparties would have had to liquidate the financial instruments given in security. All the coverage instruments would have become unraveled and this would have entailed serious losses for the counterparties, some of which would also have gone bankrupt. If LTCM had had to liquidate its positions and

if the financial establishments acting as counterparties had likewise had to liquidate, at scrap value, the cumulative worth of the public and private debts put up for sale would have undergone an abrupt downturn. High-quality collaterals would have been deprived of their value. The prices of the debts of numerous countries might have fallen dangerously and their interest rates would have shot up. From the beginning of August to October the spread of high-yield bonds jumped from 350 to 750 basis points, a doubling in two months! To avoid a form of financial panic that would have wreaked havoc on financial markets throughout the world, the New York Federal Reserve "invited" a group of financial establishments to look into ways of avoiding the liquidation of LTCM.

On September 23, 1998, following four days and four nights of strenuous negotiations, 16 worldwide – not exclusively American – financial establishments invested $3.6 billion in exchange for 90 percent of LTCM's assets. It must be emphasized that at no point were public funds allocated. Private establishments provided the funds necessary to its survival. It also bears mentioning that on the occasion of the bailout, the hedge fund shareholders relinquished over 90 percent of their investments. This fund was salvaged and yet LTCM investors failed – let's put it euphemistically – to get back their outlay. Last but not least, the creditors transformed into shareholders were the parties who took on the fund management. In four days, the New York Federal Reserve worked out a solution analogous to an out-of-court restructuring alternative, which could have taken months. In November 1999, the new leaders of LTCM were about to complete repayment of 90 percent of the $3.6 billion owed to their creditors and shareholders. By March 2000, it was a closed incident – well done, but only after some teetering on the brink.

Prices on the futures markets

Futures markets offer an efficacious mechanism of price formation. They ensure a discovery function concerning price expectations for the

products they quote. For example, the simple fact that a refiner may observe the price of crude oil not only today but also three months from now is highly informative. The price of crude oil in three months reflects the trend of its future *spot* price based on today's news.

In fact, futures markets organize a zero-sum game. What the purchaser of a contract wins is lost by the seller, or vice versa. Even when one of the contracting parties covers a risk, he may well lose. The oil refiner who sells petroleum product futures at 21 to cover a three-month risk by padlocking current prices runs the risk of seeing the price of refined oil rise to 30; he will as a result have lost 10 in relation to market quotation at the moment of delivery. A winner, a loser; such is the implacable law of futures markets. Let me add that this statement is not altogether precise enough: in reality each winning contract goes together with a losing contract.[10] Once again, this market makes concrete the confrontation of two opponents with diametrically opposed forecasts of price evolution.

Readers may say that this is also the case for stocks – not quite, because stock investment is not resolved on the same horizon. On the stock market everyone may win, everyone may lose, even if only half of the actors have an exact view of the future. The seller and buyer of a stock can both win because their horizons are different. The stock market has no time-related constraints. An investor may believe that his share will decline in value; he will sell it at 140. The share may indeed dip to 100 and he was right to sell; a few months or years later, the share rises to 160. The other investor has bought it at 140 and may resell it at 160. Both were right and both have won! The time horizon an investor sets for himself always remains his own; it is not in any way imposed by the market.

Futures markets are quite another ball game. The way "wagers" come out is irrefutably *time marked*: three months, six months, nine months, one year. In contrast to those on the spot market, the forecasting horizons of buyers and sellers of futures are exactly the same. When the "exit bell" rings, one contract is a winner and the other a loser. In fact the futures market represents, at a precisely delineated moment, a

fleeting agreement in relation to two basic disagreements: while one thinks that over the next, say, three months, the price of underlying assets will go up, the other is equally persuaded of the opposite. If the price does indeed go up, the long contract is the vanquisher and the short contract the vanquished. An additional difference to the spot market consists in the fact that on the latter, no actor strives to cover the "physical" positions he holds elsewhere. On futures markets, some actors hold "physical" positions that they endeavor to provide with coverage; others are sheer speculators who take risks based on their vision of the future. When they intervene on a futures market, speculators are hardly attuned to the "music of chance". Before buying or selling contracts, they compare spot and long-term prices with their own informed projections. When they are convinced that today's prices are low on the totem pole in relation to their anticipations, they purchase contracts – they go long. On the US markets, such investors are characterized as "bulls". Their less optimistically inclined counterparts go short: according to them, today's prices appreciably exceed tomorrow's. They are called "bears". At any given point in time, bullish and bearish capital is rigorously equivalent. The number of long contracts is always tantamount to the number of short contracts.

Let's return to the reasoning we elaborated in the last chapter in relation to the spot market and adapt it to the specific case of the futures market. Take T (T as traders, the number of actors on the market at a precise point in time). Let us suppose that 60 percent are buyers, and the other 40 percent sellers. The number of buyers is designated 60%T and the number of sellers 40%T. Nl is the average number of contracts purchased by each bull (a speculator who is long) and Ns the average number of contracts sold by each bear (a speculator who is short). The bulls are 60%T and together they own $60\%T \times Nl$ contracts. The bears are 40%T and together they own $40\%T \times Ns$ contracts. The number of long contracts must be equal to the number of short contracts and so: $60\%T \times Nl = 40\%T \times Ns$. Obviously Ns is larger than Nl. As a result, the bears own more contracts than the bulls.

How can we link the percentage of long (short) contracts to the percentage of optimistic (pessimistic) traders? On the spot market, we noted that the percentage of selling traders corresponds to the percentage of pessimists who are ready to intervene on the market and who hold shares; these traders are both pessimistic and shareholders. Futures markets are quite another story. The percentage of short traders corresponds to that of pessimists who have intervened on the market; it is not necessary that they are shareholders to sell futures. If we define the percentage of optimists deciding to intervene on the market as o%, the number of long traders is equal to o% × T. The number of short traders is the number of pessimistic traders, p%T, in which p% is the percentage of pessimists among those deciding to intervene on the market (and of course, p% = 100% – o%). One may write: o% × T × Nl = p%T × Ns. As a result, the optimists hold on average more (or fewer) long contracts than the pessimists, thereby reflecting the ratio of the number of bulls to the number of bears in the market. R. Earl Hadady put forward the following example:

> Assume a consensus of 90 percent, that is, 9 out of 10 traders are bullish and expecting prices to rise ... on an average, the trader who is long (a bull) holds only one ninth as many contracts as the trader who is short (a bear).[11]

When what Hadady calls the "Bullish Consensus" reaches such elevated levels, a turnaround in prices grows more and more likely. This factor is the basis for the approach of the "contrarians", who take a position contrary to market sentiment in order to profit from market somersaults. Yet what matters for us is to underline the basic difference between futures markets and spot markets. While on the latter bulls cannot possibly be more numerous than bears, this is not the case on the former. On the futures market, bears can trade without being shareholders. In fact, The Bullish Consensus may take on values ranging from 0 to 100 percent.

> To facilitate its use, the Bullish Consensus is scaled from 0 to 100 percent. The extreme of 0 percent means that everyone is

> unequivocally bearish and expecting prices to move lower, 50 percent is neutral, and 100 percent means everyone is unequivocally bullish and is expecting prices to move higher. Typically, the Bullish Consensus numbers tend to stay in the range of 30 to 70 percent. At 30 percent, an oversold condition is beginning to develop, whereas at 70 percent an overbought condition is developing. Oversold refers to a market condition in which there is a scarcity of buyers, whereas overbought refers to a scarcity of sellers. As the extremes of 0 percent and 100 percent are approached, a reversal in the trend of the consensus and prices becomes more and more probable and imminent.[12]

It seems that this turnaround is more likely in overbought than in oversold positions. Prices on the futures market are bound to converge with prices on the spot market. It should be added that mechanisms of index arbitrage exploit the differences between these two markets. Arbitrageurs sell a futures contract and purchase the underlying asset when the former is overpriced in relation to the latter. But on the spot market – in contrast to the futures market – there cannot possibly exist a situation in which the optimists outnumber the pessimists. The arbitraging mechanisms may destabilize the spot market when the volume traded on futures markets is far greater than that on spot markets. Bruce Jacobs remarks that several weeks before the October 1987 crash, futures were sold at large discounts with regard to underlying assets:

> Futures trading may also have destabilizing effects on the underlying stock market if it encourages a volume of trading that cannot be easily accommodated by existing sources of liquidity. Gregory Duffee and his colleagues find that index arbitrage may prove destabilizing when heavy arbitrage volume exhausts liquidity in the underlying spot market. This is conceivable because of the substantial volume of futures contracts traded relative to the value of the underlying shares outstanding.[13]

Normally, this type of mismatch would have led the arbitrageurs to sell off overly expensive stocks in order to buy cheaper futures. In fact, these price differences simply lessened buying movement on the spot market. In our analytical framework, we would say that given the high degree of optimism that led to heightened prices before the crash, a slight disruption of the consensus could trigger a pronounced imbalance on the spot market. The instant-by-instant equilibrium of the latter at such high levels of optimism could be achieved only if existing stockholders assumed the largest part of market trading. Lower optimism meant that non-shareholders had to intervene. On the market for stock index futures contracts, there exist no such constraints. Contracts may be sold short without being held. The futures market is (and was in 1987) a direct reflection of the ebbing of "bullish sentiment". This was underlined by the Brady Commission constituted by US President Ronald Reagan to analyze the October 1987 events:

> The enormous futures discounts signaled to prospective buyers that future declines were imminent ... This "billboard effect" inhibited some stock purchases. Moreover, the futures discount made stocks appear expensive, inhibiting buying support on the market. The pathology of disconnected markets fed on itself. Faced with a surfeit of sellers and a scarcity of buyers, both markets (futures and stocks) were at times on October 19 and 20 nearly in free-fall.[14]

Following the 1987 crash, futures markets in the US took a series of measures to institute daily price movement limits on stock index futures contracts. Price variations were subjected to limitations on the third Friday of every third month, which was known at the time as the "triple witching day", the settlement date for stock index futures contracts, stock index options and options on stock index futures. It had been noted that on that day, the spot (stock) market showed abnormal volatility. This finding should not take us by surprise: futures markets allowed the bears to express their pessimism without holding and having

to sell underlying assets. Yet price convergence between the underlying assets and the derivatives should indeed lead the spot prices to plummet on the days that the shorts unwind. These are like converging waves: they are fleeting but leave behind the devastating effects of a cyclone when the dam breaks. Options also function as a barrier to bearish sentiment that might break out all of a sudden.

Options

An Egyptian papyrus dating from the middle of the second century BC details a loan where the lender agrees not to be reimbursed if the boat and its cargo were to be lost at sea, in return for 33 percent interest.[15] In today's financial analysis terms, we would say that the shipmaster had purchased an option to default, in exchange for a 33 percent premium.

Two French economists, Eric Briys and François de Varenne, unearthed the example of a similar loan dating from 1298. A Genoese merchant named Benedetto Zaccaria wished to invest in a shipload of 30 tons of alum (used in dyeing and tanning) from Aigues Mortes, on the French Mediterranean coast, to Bruges, in other words from southern to western Europe. Marine navigation was protracted: it would take two months to haul the freight. Nothing could be taken for granted and the risk of disaster was never to be precluded. What Zaccaria did was to sell the goods to two Genoese financiers, Enrico Suppa and Baliano Grilli; he also promised to repurchase them on their safe arrival in Bruges at a price significantly higher than that of the preliminary spot transaction. If all went well, Suppa and Grilli would cash in; as for Zaccaria, having repurchased the alum he would be in a position to sell it at a higher price on the Bruges market. Were the goods to be lost, Zaccaria would owe nothing. He would have effected his sale – albeit at a price markedly lower than he would have achieved at Bruges – so a heist or shipwreck was by no means the end of the world.

The operation may be analyzed in the following manner: Zaccaria purchased a buying option, a "call" that endowed him with the right (but not the obligation) to repurchase the goods at a future date and at a predetermined price. When you purchase a call, you purchase as of now the underlying asset (the cargo of alum) at a future date (two months hence) at a price established today. It is only in two months that Zaccaria may be compelled to pay. He does not necessarily have to do so; if the boat fails to arrive in Bruges, he will not repurchase the freight. Rather than selling the latter to Suppa and Grilli while promising to repurchase it in the event of safe arrival at the Belgian port, Zaccaria could have bought a "put" (an option to sell) from Suppa and Grilli. An option to sell provides him with the possibility (but not the obligation) to sell the freight at a predetermined price on a given date. Zaccaria could have bought from the two financiers the possibility of receiving the price of the freight had the boat failed to arrive safely. In that case, Zaccaria would exercise his option and indeed receive the agreed price for the freight. This quite probably makes you think of insurance policies. It so happens that subscribing to an insurance contract is equivalent to purchasing a put option. The insured party pays a premium in order to have the option to transfer his or her loss to the insurer.

This example also illustrates the "put–call" parity, which has been shown to be essential when measuring the value of an option. For Zaccaria it is equivalent to either purchasing a call option for the freight at a given price (after having sold the freight at this price), or else purchasing a put option for the freight that he keeps. The value of a call augmented by the cash corresponding to the strike price (see below) of the option must be equal to the value of a put supplemented by the market value of the underlying assets.

Options have been bought and sold for ages on the over-the-counter market. *Negotiable* options only came into being more recently. Traces of the latter may be detected in the tulip crash on the Amsterdam Stock Market in the 1630s. Options were once again encountered in the newly

independent United States towards the end of the eighteenth century. There also existed in Paris a market in undated bonds (the equivalent of gilts in the UK) and an option market in these bonds; it was the world's largest in the 1850s. Louis Bachelier made this the subject of his PhD thesis in 1900 but was not able to resolve the problem of option valuation. Options had disappeared in the 1929 crash on the New York Stock Exchange.

In 1972, during a course in finance that I was taking at Wharton, we had the privilege of welcoming a distinctively tall, debonair young man in his mid-30s who was a financial researcher at Cambridge. His name was Fisher Black and he told us how he had managed to resolve the problem that had perhaps driven Louis Bachelier to distraction: the value of an option. His reasoning, built on the link between the value of an option and that of the underlying asset, was singularly elegant: when a stock's price increases, the price of an option to buy that stock also goes up, and vice versa. In theory one could sell an option to sell a stock that one holds and completely hedge one's risks; the beneficial outcome of this operation would be the risk-free rate. Since at that time options played no role on the market, I wondered to what practical use this discovery might be put. Just one year later, Fisher Black, Myron S. Scholes and Robert C. Merton published the results of their research and the magic formula for valuing an option.[16] That same year, a market for stock options officially opened. The first transactions of negotiable stock options took place on April 26, 1973 at the Chicago Board Options Exchange (CBOE). This marked the beginning of the options industry boom. These options enjoyed remarkable success and were quickly adapted to other US and non-US stock exchanges.

Furthermore, the formula elaborated by Black and Scholes applied not just to stock options. Markets were created in order to quote options on all kinds of underlying assets. Interest rates came first: in November 1981, the first options on interest rates negotiated on an organized market were introduced in Amsterdam. They were not highly successful. On the other hand, the futures option market set up by the Chicago

Board of Trade on October 1, 1982 was and remains a success, as is the market of options on three-month Eurodollar futures introduced on March 20, 1982 at the Chicago Mercantile Exchange. Similar instruments were subsequently and successfully introduced in London, Singapore, Paris and all financial centers where interest-rate futures were traded.

Also in 1982 negotiable options markets for commodity futures contracts first appeared, again in the US. However, with the exception of futures contracts for corn, soybeans and oil, the results were less than spectacular. Outside the US, only a few options for commodity futures were introduced, and the number of those presently active is even lower. The first market for stock index options was established on March 11, 1983 by the CBOE. At that time it was based on a specific index elaborated from the prices of the 100 most important stocks serving as support for negotiation of options at the CBOE. This index now goes by the name of S&P (Standard and Poor's) 100. The market immediately made great strides, following which numerous contracts of the same nature but based on other indexes were introduced by various stock markets located both in the US and in other financial centers. This instrument remains by far the most widely negotiated option throughout the world.

Last but not least, the first options on currency futures were negotiated on January 24, 1984 at the Chicago Mercantile Exchange. Following a period of pronounced growth, such transactions have to some extent hit the skids. The organized markets have had a hard time resisting the competition of over-the-counter currency options negotiated between banks. The formula put into print by Black and Scholes allows for the valuation not only of quoted options, but also of over-the-counter options. It is of practical use for a wide variety of options tailored to investors' needs; it is also brought to bear in analysis of option situations outside the financial market, for example on the insurance market or in deciding on large-scale industrial investments. "Optional" is the key word, and there are options everywhere.

In contrast to futures contracts, options do not represent firm and definitive commitments. An option confers on its purchaser a right but

not an obligation to buy or sell the underlying asset at a price established in advance, known as the *strike price*. This right can be exercised only during the life of the option, that is up to the exercise date. If the option provides its holder with the possibility of buying, it is known as a *call*. If the option provides its holder with the possibility of selling, it is termed a *put*. For instance, on stock markets put options give the holder the right to sell shares at a predetermined price and thereby ensure them a floor price. The seller of these put options runs the risk that the price of the shares "bottoms out". The purchaser of a call may exercise his option to buy the underlying asset (we also say "take up" his option), that is buy the asset serving as a support, but he is never compelled to do so. He may choose to give up his option. As for the seller of a call, he must necessarily deliver the supporting assets at the agreed price; he has no choice but to obey the buyer. Identical reasoning may be employed for a put. The purchaser of a put may exercise his option, that is sell the underlying asset, but he is never compelled to do so and he has the right to give it up. On the other hand the seller of the put option has no choice; he must necessarily receive the underlying asset and pay the strike price, if and when the purchaser exercises his option. An option is asymmetrical; the seller's position is not in symmetry with that of the buyer of the option.

An option is freely negotiable on the market up to the exercise date. Until that date, an option has a value that depends particularly on the value of the underlying asset and the strike price. A call is *in the money* when the price of the underlying asset is greater than the strike price. When on the contrary the former is lower than the latter, the call is said to be *out of the money*. The difference between asset price and strike price defines the intrinsic value of the call. A put is in the money when the price of the underlying asset is inferior to the strike price. It is out of the money when the former is superior to the latter. The difference between strike price and asset price defines the intrinsic value of the put. And if these two prices are equal, the option, whether it be call or put, is deemed *at the money*. Were he to immediately exercise an option

in the money, the purchaser of a call would obtain a sum total equal to the difference between the price of the underlying asset and the strike price, and the buyer of a put the difference between the strike price and that of the underlying asset. This sum total corresponds to the intrinsic value of the option. If the option is out of the money, its intrinsic value is tantamount to zero.

In fact, the value of an option is always higher than its intrinsic value, which means (leaving transaction costs aside) that it is never in the interest of the purchaser of an option to exercise it, but to sell it. For what reason is an option worth more than its intrinsic value? Until the expiry date, the exercise of an option may turn out to be much more profitable than today; the price of the underlying asset may keep on climbing for the call (declining for the put). And if the subsequent exercise of the option is a source of more sizable profit, it is to be expected that its price today is slightly superior to its intrinsic value. This increase corresponds to time value and is also known as speculative value. It is said that the option has a positive time value. The closer one gets to the expiry date, the more the worth of time gravitates towards zero. Isn't this poetic?

The risk incurred by the purchaser of an option is limited to the loss of the premium that he initially put forward. The risk the seller runs is altogether different; his eventual loss may go well beyond the total amount of the guarantee he had to deposit. Fortunately for him, options are negotiable; the seller of a call or a put may indeed, on principle, liquidate a henceforth patently losing position, provided of course that sufficient liquidities be present, i.e. that there is somebody to buy it.

The benefits of options

What precisely is the usefulness of options? One characteristic they have in common with futures contracts is that they provide protection against the risks of price fluctuation. The difference is the following. When he

buys or sells a futures contract, a trader is perfectly immunized from higher (or lower) prices, but he is also deprived *ipso facto* of the fruits of favorable developments that he might have failed to anticipate, such as a rise (or fall) in prices. Just like virtually all financial instruments other than options or optional products, a future is a symmetrical asset. As for the option, it at once protects from negative trends and safeguards the chances of positive developments. The asymmetrical nature of options thereby represents a form of progress. They provide a sort of umbrella, but do not force you to forgo the benefits of sunshine. But in finance, there is no such thing as a free lunch: the purchase of an option has a cost, that is the value of the premium; the latter is at times decidedly high.

That said, options may be put to the same use as futures contracts. Think of the oil refiner wishing to shield himself from price rises for the crude oil that he will need to make his refinery run, of the currencies a merchant will need to pay for what he imports, of the shares that will prove useful in pension fund management. These people will avail themselves of calls, of options to buy. Then think of the trader who wishes to shelter himself from the risk of falls in the prices of the gas and fuel he has in stock, of the currencies emanating from a merchant's exports, of the shares that will have to be sold for the sake of employee retirement. These people will avail themselves of puts, of options to sell. Let us not forget, however, that the first market for modern options actually dealt in stocks. In fact stock index options present an additional source of interest; affording portfolio protection, they also allow one to play the market.

Index options allow one to bet on a rise or fall in stock prices without having to buy or sell the underlying securities. The purchase of a call with a strike price of 1000 on the S&P index enables the investor to benefit from the rise without buying stocks. It endows him with the right to buy (at the price of 1000) shares that will grow in value. Yet he has paid the option premium for this right; his net profit is equal to the gains minus the premium. If the market collapses, the buyer of the option will not exercise his right; he will lose nothing other than the

premium he paid in order to acquire the option. The latter thereby allows him to dissociate gains from losses. In any event, the seller of the option is subjected to the decision of the purchaser, who will exercise his option if – and only if – it is profitable. The call is profitable if – and only if – the price of the underlying asset is higher than that of the strike price. The seller of the option can endure limitless losses if the price of the stock goes limitlessly up. For short-term and quoted options, this is highly unlikely, but once options become durable such risks are hardly chimerical (see Enron below).

The option to sell possesses the same virtues as the option to buy. The two may be seen as twins. Having paid the premium, the investor acquires the right to sell (at a strike price of 100) shares that may come to be worth appreciably less. In the event that the price of the stock goes up instead of down, the buyer of the put option loses nothing other than the premium. The purchase of a put enables the investor to safeguard his portfolio and the option premium he pays is altogether comparable to an insurance premium: the option at once sets a floor for the portfolio's value and leaves it with growth potential.

The asymmetrical character of an option renders the seller sure to collect a known sum of money, the option premium, in exchange for an uncontrollable risk. Of course this risk can be measured in terms of the volatility of the past price, but the future is uncertain. As we have already noted, finance does not know how to analyze major risks, that is risks with perhaps catastrophic consequences but whose likelihood appears infinitesimal. The seller of a put option exposes himself to a highly sizable loss in the event that the price index heads south. This possibility can never be summarily ruled out. That is why so many investors endeavor to cover this risk by purchasing puts. When doing so, they pass on the risk of a free fall in prices to those who sell options. To cover this risk in their turn, the latter resort to sundry techniques, all of which basically consist in ridding themselves of the hot potato. One of these methods leads to the construction of synthetic options and probably made a quite significant contribution to the crash of 1987.

In a remarkable piece of work dealing with the impact of options on market crises, Jacobs shows that the various strategies through which the sellers of options or the investors themselves strive to hedge their risks has a boomerang effect on the stock market and provokes the very sort of panic attacks they were meant to avert:

> Used by market professionals, this strategy, known as option replication, requires mechanistic selling as stock prices decline and buying as stock prices rise. When a large enough number of investors engage in this trend following "dynamic hedging", their trading demands can sweep markets along with them, elevating stock prices at some times and causing dramatic price drops at others. Dynamic hedging associated with some $100 billion in option-replication strategies caused a US stock market crash in 1987 that wiped out almost a quarter of US equity value and ignited market crashes around the world. Today, the same dynamic hedging underlies hundreds of billions of dollars in institutional and retail products.[17]

Swaps

A swap is fundamentally an exchange; its economic logic is that of barter. A swap is a contract between two offsetting sides who exchange a series of cash flows. Developed in the late 1970s and the early 1980s and designed to offer traders some protection from interest rate and exchange risks, this instrument turned out to be remarkably successful. In its simplest form (*plain vanilla*), one of the traders promises to pay at a floated rate and to collect at a fixed rate. When the two traders intervene in the same currency, they proceed to an *interest rate* swap; when they employ (for example) yen as well as euros, theirs is a *currency* swap. In the latter hypothesis, they effect a double exchange of capital. Currency swaps may be presented in three forms: traders exchange in one currency at a fixed rate against another currency at a floating rate; they may also exchange in

one currency at a fixed rate against another currency at an equally fixed rate; last but not least, they may exchange in one currency at a variable rate against another currency likewise at a floating rate.

The success of such swaps has led to their being extended to other underlying assets such as stock market indexes and raw materials. In 1979 Bankers Trust, an American bank, brought about the first share swap. In this kind of deal, an investor may pay for the performance of a market index against a series of coupon issues at either a fixed or a floating rate. The opposite is also possible, in which case an investor receives the performance of a market index against the payment of a fixed or floating rate, which is strictly equivalent to borrowing in order to invest in stocks. Finally, it bears mentioning that swaps are not quoted instruments; they remain confined to the OTC market, in contrast to options, which are negotiated on both the regulated and the OTC markets.

The range of options

The first options negotiated over the counter featured currencies as underlying assets. From the mid-1980s onwards, there had been OTC options on interest rates, and then on stock market indexes and finally on commodities. The purpose of OTC options is by no means original; they do not significantly differ from those traded on organized markets. That said, they feature three specific characteristics: they are not negotiable on a secondary market; they are not standardized; and they can extend very far in the future.

The optional character is not limited to full-fledged options. Even old instruments created prior to the Black–Scholes formula may be cogently analyzed by means of the logic of options. Let's take convertibles as an example. A bond convertible into stocks is a security offering rather limited returns to its holder; that said, it allows him to profit from a rise in the price of a share by providing him with the possibility to buy the latter at a preset price. This product may consequently be broken down into a bond and a call option to correspond to the demand of investors

interested in just one of these two components (see Chapter 7). However, there is more. Options are not restricted to the financial sphere in general and to the markets in particular. When you invest, you can opt for options bestowing some freedom of choice. Isn't divorce a possible option for young newlyweds? In addition to the traditional assets on which options many be brought to bear (and marriage is not a listed item!), a whole multitude of extraneous applications partake of the selfsame logic. This is a new way of looking at what is and what just might come to be.

Risks exist that one does not suspect could be exchanged on a market; just think of "acts of God". Options on an earthquake risk correspond to a need of the insurance companies. However, how can one be covered as regards an earthquake? What about a terrorist attack entailing over 3,000 fatalities? The reasoning remains the same: how is one to get rid of a risk? How is one to analyze this risk and thereby take charge of it?

For "natural" catastrophes, the primary virtue of a derivatives market consists in identifying, stripping down, comprehending and assessing the risk in order to have it transferred from a trader who wishes to cast it off to another trader who is willing to take it on. But financiers are not the terrorists who originally created the risk. All they are striving to do is to contain the financial repercussions. We will forever stand in need of the state in order to prevent risk from materializing. If push comes to shove (and worse), the "real" world rather than the financial markets stands accused.

In the US, oil, natural gas and fuel used for heating display a volatility markedly greater than that of the stock market. At times, the volatility of natural gas is no less than four times greater than that of the S&P 500 index. Which link of the chain carries the risk and bears the consequences? Needless to say, it is consumers who see their gas and electricity bills go up and down in accordance with the price fluctuations of fuel and natural gas. Since 1978 for fuel and 1990 for natural gas, derivatives markets have existed through which price risks for fuel and gas are exchanged by dint of futures contracts and options. They enable

the user to attenuate if not altogether eliminate the risk of month-by-month discrepancies in bills for utilities.

Eric Briys and François de Varenne put forward the proposition that banks should index the cost of fishermen's debt on the price of fish.[18] When the selling price of fish rose, so would the financial expenses (and vice versa). The fisherman would thereby extricate himself from the vicious circle of inflexibly predetermined financial costs. This would mean the creation of a derivative product, an interest rate indexed on the price of fish, transferring risk away from the fishermen and towards the banks. Banks are obviously in no position to take on a risk with which they cannot cope. That is why, according to Briys and de Varenne, it would make sense to set up a futures market for fish in which the prices for the main ichthyoids would be quoted day in and day out for transactions to come in three, six, nine months and so on. Banks could transfer the risks of fishermen towards other industrial seafood traders; speculators would likewise be called on.

Such markets have yet to come into being, but a sort of rating agency was created in 1999 and has managed to rein in the necessary volatility of salmon prices. So the magic Black–Scholes formula has been applied to the fish market. Some elements of an explanation were suggested in *The Economist*:

> If they were grateful types, Alaska salmon fishermen would feel their future was a little more secure, thanks to an equation first developed in 1973 for pricing financial options. The Marine Stewardship Council (MSC), a not-for-profit agency that campaigns for sustainable fishing, has given the Alaska salmon industry its stamp of approval, as it has the fishing of New Zealand hoki, Western Australia rock lobster, Burry Inlet cookies (in Wales) and Thames Blackwater herring. MSC certification ensures a certain standard of fishery and environmental management, which customers are said to value. For the fisherman, one long-term benefit of certification should be to cut the volatility of fish

> catches and, hence, prices. But how to put a value on it? Z/Yen, a London-based "risk-reward" consultancy, suggests applying the Black–Scholes formula, variations of which are widely used for pricing financial (and stock) options ... The price history of five types of Alaska salmon – sockeye, chum, coho, pink and chinook – shows considerable volatility over the past 30 years. For this exercise, it was assumed that MSC certification will reduce price volatility to, at best, the lowest of recent years ... As every option trader knows, though, Black–Scholes, or any other option formula, depends on your own forecast of volatility. To test the theory, predictions will need to be replaced, after a few years of certification experience, with actual data on volatility. Better hope that gluts of farmed salmon, oil spills or even nausea brought on by calculating data hedging at sea don't spoil the fun first.[19]

According to numerous authors, the real economy has been imperiled by a hypertrophied financial world often caricatured as the "virtual economy". Nevertheless, the same authors quite rightfully take the real economy to task for its inequalities and injustices. "Has one stopped to think", ask Briys and de Varenne, "of the fact that the extensiveness of the virtual economy is but the mirror image of the tyranny of the real economy, which is hardly the Eden of stability and sharing praised up by some authors?"[20] The great volumes exchanged on the virtual markets reflect the gaping deficiencies of the real economy. It is the real economy that enslaves, whereas the virtual economy emancipates. Derivatives nonetheless continue to be viewed very pejoratively.

The risks of derivatives

Derivatives markets are a highly efficient mechanism for risk intermediation. But at times it seems that risk has become a four-letter word. While they were created to afford protection from volatility, institutions

such as derivatives markets can be seen as devolving into factors of instability, most notably when favoring the manifestation of speculative financial scandals. The blossoming of derivatives markets has indeed been punctuated by untoward incidents such as the Barings bankruptcy, the losses posted by Metallgesellschaft, the near-death experience of LTCM, the "end run" of Enron and so on. Previously hidden risks became headline material. People conclude that derivatives are a factor of price volatility. However, the causes of these débâcles have little to do with derivatives, but with the lack of transparency, the failure of audit compliance and, more often than not, a serious risk oversight. At Barings Bank, a single trader in the Singapore office lost $1.3 billion trading futures on the Japanese market, and the ensuing financial sacrifice led to the collapse of this 200-year-old institution in 1995. Two years earlier, German industrial giant Metallgesellschaft had to relinquish $1.3 billion on oil futures and swaps. In both cases, proper supervision could have avoided disaster.

Enron's December 2001 bankruptcy became known as "Enrongate". Enron had become famous for the new trails it had opened in the market for trading risks. The company was not just the world leader in energy trading, it was also a telecommunications conglomerate, an asset manager, a manufacturer of paper and timber and an insurer. For several years, American investment managers had routinely anointed Enron "the most admired company". At the conclusion of 2000 this American behemoth, created in 1985 through the merger of two operators of natural gas pipelines,[21] was, with $64.4 billion, the fifth largest energy company in the world in terms of market capitalization. From 1996 until September 2000, its market value had been multiplied sixfold; its sales had grown, mushrooming during the same four years from $13.3 billion to a trifle over $100 billion. It was the seventh largest company in the Fortune 500 by overall turnover. Enron had signed contracts with more than 28,500 customers, ensuring them supplies in energy, wood, paper and water; it also unburdened them of the risk of price fluctuation. In addition, Enron dealt with steel makers, glass manufacturers, shopping

malls, local government authorities and newspapers such as the *New York Times*, to which Enron guaranteed manageable expenses for paper.

Disposing not only of energy production assets but also of an online trading platform that it had invented and through which it served as rainmaker and sunshine promoter (handling meteorological risks), Enron was on the verge of cashing in on the wager it had made in 1995 and was about to become the top global performer in the energy field. The logo emblazoning the lobby of its Houston headquarters unmistakably introduced "The World's Leading Company". But then, on October 16, 2001, its unfortunate fate was sealed on disclosure of a net loss of $618 million over the third quarter of the year. What was worse, Enron had conveniently forgotten to mention extraordinary charges to the tune of $1.2 billion that had been amassed on off-balance-sheet transactions. The rating agency Moody's was thinking about downgrading its debt to junk bonds. Enron's financial strength was consequently called into question. On November 8 the company announced that it would have to reduce its 18 most recent quarterly profits to take "special purpose entities" (off-balance-sheet items camouflaging debts) into full account. Annual results were pared down by $96 million (1997), $113 million (1998), $250 million (1999) and $132 million (2000). On November 28 the other rating agency (Standard and Poor's) downgraded its notation to a notch below the investment grade; this move triggered the repayment of no less than $4 billion of off-balance-sheet debts.

The withdrawal of a takeover offer by Enron's American competitor Dynergy precipitated a bankruptcy that nobody had seen coming. Many investors, including a large number of small shareholders and company employees who had invested their retirement funds, lost virtually the entirety of their holdings.

As is the case in most of the major scandals of recent years, Enron is illustrative not of a systemic risk furthered by the latter, but rather of primeval, only too human fragility. It behoves us to remember that Enron invented a new market that proved itself indispensable when the whole energy field was deregulated. It is important to understand that without

a wholesale market, the deregulation of energy markets would not have functioned effectively. During a colloquium organized by Wharton at the beginning of 2002, participants put forward the following analysis:

> Producers and users of gas, oil, electricity and other forms of energy rely on Enron's system for trading futures, forwards, options, swaps and other contracts to get the best prices and control costs far into the future. Without such a system, deregulation simply cannot work. Previously, large regulated utilities were vertically integrated, giving them control from wellhead to consumer. Deregulation effectively broke apart the production, long-range distribution and transmission functions, leaving each to a different set of players. A factory owner, for example, can now buy gas or electricity from a number of producers.
>
> To function, a free market such as this needs brokers, or intermediaries, to create, buy and sell contracts for production and delivery, and it requires a market maker to facilitate trading, just as the big Wall Street firms and exchanges facilitate trading in stocks. Enron created that marketplace.

Enron's position in this new marketplace became less profitable as new competitors entered the business. The pioneer had to blaze new trails in the market for trading risks. As Enron expanded in new markets like broad based advertising space, it started losing on a big scale. Derivative markets exert a stabilizing influence if they transact enough business to generate meaningful profits. Such is the dilemma of the pioneers. Finally, its financial statements have not been reflecting the nature of the risk associated with Enron's business. By the end of the 1990s, the distinctions between banks, brokerage houses and traders such as Enron had been rendered all but meaningless. Enron was an unregulated market that just happened to be in possession of electricity lines. Once it had created its revolutionary system of web-based energy trade (EnronOnline), the group became one of the planet's largest markets for commodities and also functioned as the reference for online markets. At one and the

same time, Enron was tantamount to the New York Stock Exchange, Goldman Sachs and American Electric Power. It was the market maker on 1,800 contracts for which it maintained bid and ask prices, but this market was subject to no control. The accountancy rules and regulations that had allowed the company to post regularly enhanced profits quarter after quarter patently needed to be reviewed and bettered. And the corporation's managers, not to mention the auditors, were liable to be grilled. In fact, in June 2002 Andersen, Enron's auditors, were found guilty of impeding justice by shredding documents. Enron went bankrupt because its business failed and the company's collapse was not even hinted at in its financial statements.

Derivative products are not dangerous as such. They become so if their management is not centralized, if they are not mastered or are poorly controlled. Control is initially exercised by the back office, but must not remain limited to this level. It is up to the general management, the board of directors and the main shareholders to control the activities of the bank or company in the field of derivative products. These instruments may grow hazardous when they are ineptly used, when their use is not customized and when traders resort to them imprudently or without discernment.

When they are correctly used, well understood, perfectly mastered and correctly controlled, derivative products allow for the performance of coverage, arbitrage and speculative operations under altogether comfortable conditions. The steadily increased use of such instruments by organizations reputed for their prudence goes to show – actions speak louder than words – that derivative products are not inherently risky. Several studies have shown that pension funds make widespread use of derivative instruments. It is in one form or another that half of institutional investors use derivative products (principally in tactical asset allocation, but also to hedge portfolios from price fluctuations).

Ignoring the media hype generated by all these scandals, the fundamental questions that ought to be put forward principally concern

the structural risks for the markets themselves. Isn't the proliferation of derivative instruments and markets rather excessive? Isn't it necessary to regulate if not do away with the derivatives markets? Last but not least – and this is the core question – don't derivative products heighten the price volatility of assets negotiated on the spot market?

The worries generated by the proliferation of derivatives pertain as much to the quantity of available products as to the number of markets on which traders may intervene. It is true that new derivatives markets have multiplied. Enron was the inventor and leading actor in trading complex financial instruments such as credit derivatives and temperature or weather-linked derivatives. It likewise invented pioneering energy markets. In its wake, the New York Mercantile Exchange, Frankfurt Stock Exchange and European stock exchange Euronext opened up new electricity markets. Nevertheless, the Enron bankruptcy had no effect on energy prices; other brokers immediately took its place in trading natural gas and energy. Its competitor ICE (Intercontinental Exchange) doubled its trading volume in the two weeks following Enron's collapse. This recent development offers edifying proof that the new products correspond to a need.

It is true that there exist many derivative markets; some may appear redundant or supernumerary. OTCs seem to duplicate the organized markets. In reality, these markets do not overlap; they do not provide exactly the same service to multiple traders. They are far more complementary than rival; financial institutions and traders appreciate the opportunity to transfer to stock markets equipped with a clearing-house the risks they incur over the counter. Moreover, the OTC markets often lead towards their regulated counterparts. Finally, the different derivative instruments tend to reach a ceiling; since 1985, the number of major financial innovations has leveled off. Customers are confronted with new products every day, but these are known derivatives for new assets. Recently there have been no innovative breakthroughs comparable to the devising of swaps, the introduction of negotiability in the options markets, the application of the contract-based concept to the

financial markets and the creation of stock-index derivatives. Market traders sift through and filter out the products with which they are presented. Instruments that do not meet true needs rapidly disappear. When we examine the various instruments proposed to traders, we note the predominance of three products: futures, options and swaps. All the others are developments, extensions and combinations of these three basic structures (more specifically, of the second and third).

The spectacular bankruptcies of traders manipulating derivatives have led some observers to recommend enhanced regulation and control to avoid a systemic risk. Having reviewed Enron's positions on the derivative product markets, Standard and Poor's measured a direct credit exposure representing a sum total of up to $3.3 billion. The debacle engendered a form of systemic risk having to do with credit coverage in numerous transactions in derivatives and with the risk of cancellation of the many swaps contracted by Enron. According to Standard and Poor's, Enron was a guarantor on approximately 50 types of derivative markets for a notional sum total of $79 billion. Take one of them, the credit derivatives market: on all the credit derivatives transactions rated in 2001 by S&P (for a total of $23 billion), Enron's proportion came to roughly 13 percent, "a much larger percentage than was to be expected of an entity that was not a broker or an investment bank or an insurer" so the grading agency experts concluded.

In 1998 Enron and other large-scale financial groups had successfully opposed the adoption of more constraining regulations advocated by the monitoring authorities following the last-minute rescue of LTCM. In fact, while the gigantic Enron bankruptcy has something to do with the question of regulatory mechanisms, what is at issue is less the derivatives markets than the transparency of financial information. Enron's turnover ($101 billion in 2000) ranked alongside such giants as Citicorp and IBM. Yet such a statistic lays bare an error in analysis: if the compilers had taken into account not the notional value of contracts traded, but rather – as do brokerage houses – commissions alone, sales would have fallen to $6.3 billion, 287th in the country.

Central bankers and monetary authorities distinguish two types of situations that involve the systemic risk of contagiousness. When stability prevails, they harbor no doubts as to the usefulness of derivatives markets; bankruptcies are merely isolated incidents demonstrating the human propensity to err. When times are tense and troublesome, they are less assertively certain. They fear that management techniques or modes of coverage may propitiate the price volatility of underlying assets. To assuage these apprehensions and ameliorate security without thereby impeding the operations performed by the various actors, four series of measures are required.

The first is to enlarge the equity capital of the leading financial institutions and calibrate proportionately the volume of the positions they take on the derivatives markets. LTCM's leverage was 25 to 1 and the figure went up to 150, which is what led to its downfall. But the important difference between Enron and LTCM is that while the latter was in many ways out of the loop, the former could be surveyed by the regulatory authorities. Enron was a major market maker, whereas LTCM was a major speculator. Enron was deeply leveraged but had hidden its debts by placing them off its balance sheet. The energy trader Mirant swiftly pointed out after its competitor's bankruptcy that it held over $5 billion of equity capital and that in-house controls limited the amount of its capital at risk to $75 million a day. Just like other intermediaries, and even more so on account of its prominent role, Enron was obliged to take the offsetting side on markets where it held sway and to function *ipso facto* as a clearinghouse. It had to supply the markets with liquidity. In addition to intermediating, it came into play on its own account. It stood in patent need of equity capital. Needless to say, Enron was quoted (well quoted, in fact), but shareholders abhor witnessing the dilution of their stocks, especially when the company posts favorable results. The alternative is a loan, but debt deteriorates agencies' ratings and shareholders are not amenable either. Hence the attraction of off-balance-sheet financing.

The second measure is to enhance the legibility and transparency of the off-balance-sheet operations recorded by banks and financial

institutions. That said, measures meant to facilitate the controls of regulatory organs must not give too much information to the competitors and the customers of financial institutions that are especially active in the markets for derivative products. LTCM was particularly opaque. Enron employed smoke and mirrors. It provided the SEC with information on its accounts but not on its off-balance-sheet activities and commitments. Enron established "special purpose vehicle" (SPV) partnerships that shifted debts and losses out of its own accounts. These SPVs were judged sufficiently separate and independent that their loss and debt did not have to be consolidated into the parent's financial statements. In most countries, such debts are consolidated into the main accounts. US accounting standards are too lax and these rules allow companies to deceive shareholders and regulators. Auditors Andersen could also be said to have been hoodwinked. It bears mentioning that several Enron senior managers had previously served at Andersen. The accountancy standards added fuel to the fire. Derivatives entail no immediate cost. "Normalizers" wishing to ensure more reliable information on derivative instruments had the requirement that they should be entered into the books at their "fair value" at the time of transaction. Fair value is congruent with either market value (if there exists an active market for the instruments to be valued) or with the present value of the cash flows they are to engender (if no market exists). The overwhelming majority of the financial instruments used by Enron were not quoted. In addition most of these derivatives had a very long maturity: Enron had some contracts going as far out as 24 years. Therefore without a market, their fair value had to be determined on the basis of in-house models themselves based on updating the aforementioned anticipated cash flows. In other words, it was Enron, along with its auditors, that determined the value of derivative contracts and, as a result, of its profits.

Thirdly, hitherto non-regulated markets should be regulated. At the very least, they should be subject to the controlling rules of the market makers; in a perfect world, they would be fully subject to the rules

applicable to the regulated markets. Rather astonishingly, energy derivatives steered clear of the surveillance of the Commodity Futures Trading Commission, whose prime mission is to administer the Commodity Exchange Act. Enron was a commodity exchange unto itself or at the very least as much a trading company as the giant Wall Street investment banks; it was frequently nicknamed the Goldman Sachs of energy. Not a bank and by no means a broker, Enron (and its subsidiary EnronOnline) found itself free from any and all jurisdiction. By 2001, Enron had actually evolved into an exchange making a market in no fewer than 1,800 categories of assets, most of which had been created by the company itself: coal, oil, natural gas, electricity derivatives and also the markets for broadband technology, rights to pollute, semiconductors, non-polluting (solar and wind-powered) energy etc. The prices were posted on its Internet site. Yet this "exchange" proceeded without the usual rules and regulations.

Finally, emphasis should be placed on control by the firm itself, the head office and also the board of directors and the main shareholders, as regards activities effected on the derivatives markets. There has also got to be indirect control via financial analysts and rating agencies. In Enron's days of glory, nobody understood how it made its profits; the "Enron model" was just an opaque black box built on deception. The profession it had invented presupposed equity capital greater than it actually possessed. Wishing to disguise its glaring failure, Enron put the cart before the horse and concealed its debts and losses through one partnership after another. The group wound up constructing a whole galaxy composed of close to 4,000 subsidiaries and joint ventures. Nobody managed to uncover the importance of Enron's leverage (a few years earlier, nobody had gauged the financial risk engendering by the indebtedness of LTCM). But concealment – and not finance – is to blame.

This issue was widely debated following the crash of 1987 and then the near bankruptcy of LTCM. Don't derivative products increase the price volatility of the assets negotiated on the spot market? In fact, futures markets are detectors and broadcasters of information. They are markets

in which just about anybody may intervene; they are freely and readily accessible. Pessimists can intervene so as to sell; they aren't necessarily the holders of the shares they sell short. It is simpler and less expensive to trade on a derivatives market than to intervene on the spot markets. To the degree that the futures markets consequently pick up all the information circulating among the traders, the prices elaborated on these markets are indeed volatile, and this volatility is transmitted by arbitrage to the asset markets. This leads to more *intraday* volatility and to more frequent price variations on the spot market.

That said, such intensified intraday volatility should not be confused with exacerbated price volatility from one day, week or month to the next. Empirical studies and theorists' conclusions appear to demonstrate that the existence of a derivative market does *not* add to the long-term volatility of financial markets. This is perhaps explained by the fact that at bottom, derivative instruments are nothing other than a means of transferring – rather than augmenting – risk. When we look beyond possibly stimulated intraday volatility, we see that the existence of futures markets reduces the long-term volatility of the underlying spot markets. This conclusion may easily be deduced from simple observation of the spot price for commodities and financial products that have not benefited at certain times from the presence of futures markets and endowed at other times with derivatives markets. Nevertheless at a given moment, the futures market may indeed wreak havoc on the spot market. On a derivatives market bears may amass sell-side positions without owning the assets, in contrast to the spot market. This is even more strongly the case for options:

> An overall increase in spot market volatility may lead to an increase in option volume, as investors seek hedges to protect portfolio values. An increase in option volume, however, also has the potential to increase volatility in the spot and futures markets, to the extent that it necessitates trend-following, dynamic hedging by option dealers and market-makers.[22]

When we resituate the role of derivatives markets in the framework of the analysis of day-to-day price fluctuations as formulated in the preceding chapter, their influence is highlighted in a new way. Analysis of transaction mechanisms goes to show that day in and day out, pessimists outnumber optimists on the stock market. Derivatives markets allow pessimists to hedge, to sell part or all of their short-term investment risk. They thereby allow for the constitution of risk-selling positions that do not immediately carry weight on the spot market. Yet these positions have to translate into sales on this market. When they unwind together, these deferred positions may provoke stock crashes on the spot market. In this way the derivatives markets play the role of a funnel or a dam holding back the risk-selling positions of pessimistic investors, which are not instantaneously expressed on the spot market. When the dykes give way, the sales flow impels a crash.

Market makers and banks operating on the OTC markets take on unlimited risk when selling options. They shall naturally try to hedge. In an ideal situation they will find a speculator ready to incur this risk, but more often than not this is not feasible. Jacobs provides the following analysis:

> In the absence of sufficient selling interest from the public, market-makers and dealers may attempt to hedge their short positions by buying options. But OTC dealers who have sold tailored options with specifications unavailable in listed markets may find they cannot synthesize an offsetting position using exchange-traded options. Furthermore, dealers and market-makers may find buying options is uneconomical in market environments in which the public displays a marked preference for buying over selling. When equity option traders cannot offset the risk of holding short option positions by either laying the positions off to speculators or buying options against them, they will have to hedge in equity futures and, possibly, stock markets. Such hedging demands buying as equity prices rise and selling as equity prices fall, exacerbating market trends.[23]

Speculators make a mistake when they strive to shield their portfolios from day-to-day fluctuations. Trend analysis shows that long-term investors amply compensate for the temporary losses they endure on the stock market. Over a horizon of 10 years minimum, investment in a stock portfolio has always offered returns greater than investments in other, fixed-income financial assets; this is the case provided that the various classes of the latter are diversified in time and space. The temptation to cover a transient risk for a stock portfolio by the use of derivative products translates the uneasiness emanating from the difference between two horizons: the time of the traders, judged on the basis of their monthly results, and the 10 to 20 years of the investors.

7

My word is my bond

You are probably acquainted with the phrase "My word is my bond." A bond is merely a promise to reimburse by a given date at stipulated interest rates. Governments and large-scale corporations generally issue bonds to finance ongoing projects. In a way they are asking investors for a loan rather than soliciting a bank for funds. The upshot is that these investors can depend on both a given rate of interest and total repayment of the loan on maturity. As for the interest paid by a bond issuer, it is basically contingent on the term (the greater it is, generally speaking, the more substantial the rate of interest) and the degree of issuer reliability, which means the likelihood of getting your money back, as stipulated.

Interest and rent

The interest rate represents the price that has to be paid to avail oneself of the privilege of using someone else's money. When you rent a car, it is leased out for the requested time of use. Financial institutions employ and apply the same basic principles. They request a form of rent, known as interest, to grant you a loan for a specified period of time. Interest is the cost of the loan, the price the lender requests from the borrower for the use of its money. It is expressed in terms of a percentage of the debt for a period of time (usually a year). If the annual interest rate is 5

percent, €5 in interest must be paid for each sum of €100 borrowed. The loaner rents out its money.

Rent and interest are members of the same family. Interest is sometimes termed the rent of money. The word "rent" is derived from the Latin *rendere*, "to render", by means of the feminine past participle *rendita* (the interest rendered through an investment). The return you obtain after having surrendered some money for a stipulated period of time corresponds to the interest you earn (or harvest).

In French, *rente* is the old appellation for government bonds that are either perpetual or issued for an exceedingly long period. From 1850 through 1914 the Paris Bourse functioned as the worldwide market for such *rentes*. A well-off person was a *rentier*, someone who drew a living from the product of the bonds in which his or her wealth was invested. This had begun with the "emigrants' billion".[1] During the French Revolution (1789–99), the goods and chattels of the nobility had been impounded and sold off. Following 1815, the nobles had returned to France and restitution was called for. The government issued a bond of a billion gold francs on which it paid guaranteed interest (but did not repay the capital). This perpetual bond was followed by many others. In 1900 the sum total of this perpetual debt came to 26 billion gold francs, that is six times more than the annual French government budget of the time. The international bonds of Germany and Russia were also quoted on the Paris Bourse and the value of the *rentes* quoted in Paris totaled 70 billion gold francs. This state of affairs persisted until the First World War, when the franc collapsed. Also, in 1917, Bolshevik Russia failed to recognize the debt of the tsarist state. This painful experience helps to explain the traditional repugnancy in France towards the financial markets. The French *rentiers* went from riches in the nineteenth century to rags in the twentieth.

From the seventeenth through nineteenth centuries in Europe, the economic growth of the Industrial Revolution was financed and fueled by state-issued bonds, the preferred means of saving. We explained earlier how the Bank of England – "the old lady of Threadneedle Street" – was

established in 1694 to lend money to the British government. Diderot's *Encylopédie* cogently defines a note or a bond as follows: "It is a prompt resource for procuring funds, when one benefits from public trust."[2] Since the Bank of England indeed enjoyed the latter, it could finance loans to the government through issuing bank notes. Given the prevailing uncertainty of the times, investors had no other way of putting their savings to work. But rather than channel resources through a bank, it was more opportune for governments directly to issue the loans to which the public subscribed. Government bonds were quoted; lenders could recover their savings in case of need. The state guaranteed interest payments – which varied from 3 to 5 percent in the nineteenth century – and thereby provided the saver with adequate security, although it did not repay the capital. Of course, savers would be caught unawares when twentieth-century inflation whittled down the purchasing power of the interest repaid. But back in the nineteenth century there was no inflation in Europe. Under such conditions, it hardly mattered that states failed to repay their debts; public bonds were preferable to the stocks quoted hither and thither on chaotic markets.[3]

A debt security representing part of the long-term borrowing issued by a collective (the state, a public or semi-public body, a cooperative, a private company) and conferring on its possessor the right to assess interest, a bond is a fixed-income security (as opposed to a stock, whose yield is subject to fluctuation). A bond is liable to be quoted and representative of a long-term loan. Either a company or the state may issue bonds. In the first case they are characterized as corporate, and in the second case as sovereign.

A company with cash requirements has available quite a few sources of finance. It can either seek it out on the equity capital market (through a new equity issue or stock market listing) or else run into debt. It may either owe money to a bank or finance itself through the bond market. Having made the second choice, it relies to a lesser extent on banks. Any individual can purchase debentures on the bond market. To offset this type of investment, he will receive coupons (the bond-based equivalent

of dividends) representing the bond interest. Bonds issued by companies are by no means risk free, since in contrast to the state, companies may go bankrupt. In that event, the issuer will not pay the interest on its loans and might at best partially repay them by the due date. The value of a bond will tend to diminish if the company grows less likely to be able to fulfill its commitments. Symmetrically and proportionally, the bond interest rate rises; this is explained by the increase in the non-payment risk premium that an investor claims when buying a bond issued by a more risky company. The risk of non-payment is often designated as "signature risk"; it justifies the spread or risk premium.

Bonds may be issued at fixed or variable rates. Securities at variable rates assumed importance in late-twentieth-century Europe as the euro-based debt market developed. In contrast to fixed-rate loans, their remuneration evolves as a function of market conditions. This type of bond made great leaps in the 1970s; the objective was to attract investors who had cooled to bond investment on account of inflation. The major advantage of these bonds lay in the capital protection they afforded, along with altogether respectable returns.

In terms of market capitalization, the bond market is markedly superior to the stock market. This is explained by the simple fact that the role assumed by the state in the bond market remains fundamental. But in terms of transactions the bond market is much less active: many investors keep their bonds until they mature.

The interest rate family includes several members. It behoves us to distinguish the *nominal* interest rate from the *real* interest rate. The real interest rate is the difference between the nominal interest rate and inflation, that is the interest rate once the effects of inflation are discounted. All other factors being equal, the higher the inflation rate, the higher the nominal interest rate. If the nominal interest rate is 7 percent and the inflation rate 2 percent, then the real interest rate is 5 percent ($7 - 2 = 5$). Lenders often use the forecasted inflation rate to calculate the forecasted real interest rate for a given nominal interest rate.

Whether nominal or real, interest rates may be short, medium or long term. Short-term interest rates are applied to loans granted for a three-year period or less; long-term interest rates are relevant to loans lasting at least 10 years; as for medium-term rates, they concern intermediate (3 – 10 year) loans. As a rule of thumb, long-term interest rates are higher than short-term interest rates; when immobilizing their funds for quite a while, loaners naturally demand more lucrative returns. The borrower's solvency and perceived investment risk are crucial factors entering into account. Finally, a simple interest rate may be distinguished from compound interest. The latter is the accrued interest that has accumulated on the principal, including that accrued over a previous period. At an annual compound interest rate of 10 percent, a deposit (or a loan) would double in value over approximately seven years, provided that no withdrawal (or repayment) were made.

How do all these interest rate family members behave? In a given economy, several factors affect the level of interest rates: supply and demand of funds, money supply, present-day and forecasted inflation rates and the monetary policy of the central banks. For example, if borrowers outnumber investors (this rarefies money for loans), loans grow dearer; their increased costliness contributes to heightened interest rates. On the other hand, people tend to invest more in order to accumulate greater interest. And once investors come to outnumber borrowers, interest rates are set for a fall! A combination of the monetary policy and its impact on short-term rates on the one hand with investors' expectations about the next move by the central bank on the other can explain the level of the various rates. Short-term interest rates depend on the policies adopted by a central bank. The latter are in turn contingent on general economic factors and on the strategy it brings to bear. Is mastery of inflation prioritized? Are exchange rates given foremost consideration? Again and again we are confronted with the problem inherent to economic mechanisms, that of the chicken and the egg. Where is the cause and where is the effect? I will explain how the evolution of short-term rates little by little comes

to influence long-term rates (those, for instance, of bonds). But then again, backlashes and boomerangs may occur; the development of long-term rates may serve the central bank as an indicator (or index) in the determination of its monetary policies. Along with the statements put forward by its governor, such policies may also be meant to modify investors' expectations, particularly in relation to the prices of long-term bonds.

The value of bonds

The price of a bond is expressed not in euros or dollars but rather in terms of a *nominal percentage*. The nominal is the face value that the bond issuer promises to repay on maturity. It functions as a reference for the price and for the payment of coupons, that is for interest calculated through application of interest rates on the nominal. The interest rate cited in the name of a bond (for example 5.25 percent, April 2008) is the "facial" rate on which relevant calculations are based. April 2008 is the stipulated date of bond repayment. The time lapse remaining prior to repayment represents the bond maturity. The bond is repaid *at par* (above par) if redemption price is equal (superior) to face value. The issue price may likewise be equal, superior or inferior to par.

The bonds may be *amortized*. In French *à mort* means putting to death and "writing off" is literally tantamount to "putting to death"; once a portion of the bond is repaid, the debt peters out, it expires little by little and goes on to disappear. Its initial cost is recouped. There are various amortization "profiles". Redeeming *in fine* is effected when the nominal is repaid once and for all on maturity of the loan. Constant amortizations do not vary from one year to the next. Amortization by annuities is performed when the sum total of the coupons and the amortizations remains the same. Some bonds do not yield the slightest coupon; they go by the name of "zero coupons". Interest is replaced by a major discount at the time of issue; repayment is effected at par.

Does a bond price reflect the celebrated "Mr. Market's" fear or greed associated with Benjamin Graham? You may remember that according to Benjamin Graham, the investor should be inclined to buy (or sell) under the condition that Mr. Market's price is below (or above) the intrinsic value. How is a bond's intrinsic value to be analyzed? Let's start by discussing government bonds: repayment presents no risk. The intrinsic value of a government bond may be analyzed in terms of the income it procures. If you wish to determine the worth of a bond, it is enough to sum up the value of the coupons to be received over the years to come. Such reckoning is easier than for stocks; we are certain of the amount represented by these coupons and of being repaid at a precise time. We must simply observe current interest rates to update these coupons and calculate their value as of now, their present value.

I have argued that the price of a stock cannot possibly reflect its intrinsic value; if a stock were "properly" priced, nobody would either sell or buy it. Everyone has a different view of the future of a stock. Bonds are another story entirely: everyone is aware of future flows, and almost everyone is in agreement about discount rates. That is why there are far fewer transactions in bonds than in stocks: since everyone agrees on the value of a bond, nobody wishes to sell or buy and investors generally keep them until maturity. The profitability of a bond retained until repayment is measured in terms of its *yield*, which is the actual interest rate to be collected by the investor. A bond with a nominal interest rate of 6 percent can for example yield 6.50 percent if the repayment price is greater than the nominal. The yield is the rate that renders equal to the price the succession of coupons to be received through the life span of the bond accrued by the capital to be repaid on maturity. This means that the price of the bond varies in a manner strictly inverse to its yield. It also means that the price of a bond results from a consensus between buyer and seller.

On the bond market, buyer and seller maintain an identical vision of times to come: the price of a bond represents total agreement on the future (this is equally the case when goods are being traded). The bond

market is the place where supply and demand meet and come to terms. It is also the posting center for a form of balance, of equality in exchange. Just like the price of goods, the price of bonds results from the confrontation of supply and demand. On the goods market, demand for a product is generated by the desire to possess and consume it. Supply of the goods reflects the desire to garner money. On the financial market demand for a bond reflects the prospects for regularly scheduled income rather than those of capital gains. The seller gives up the certainty of future flows; the buyer acquires the assurance of an annuity. The price of a bond has the nature of a perfectly reflected consensus on the future. The major difference between a stock and a bond is that while a bond investor is fully aware of what he will go on to receive if he keeps the bond until maturity, the seller is likewise aware of what he has decided to relinquish. This is *not* the case for a stock!

If the investor does not wish to bide his time until maturity ensues, he may cede his bond on the market, in which case returns on investment can differ markedly from the aforementioned yield. Just like that of a stock, the profitability of a bond must take into account the capital appreciation (or depreciation) that the investor collects (or sustains) when he resells the security prior to bond maturity. If rates have increased, the bond's price will have decreased so that its yield is adjusted to that of the newly issued bonds. This entails a real risk of capital loss or depreciation.

Let's take a concrete example. Suppose that you hold a 5.25 percent bond issued when rates were indeed equal to 5.25 percent. If the latter goes up to 5.75 percent, this 0.50 percent increase effectively lowers the price of the bond by, say, 4.50 percent. Over a year, instead of earning 5.75 percent, the investor will earn (5.25 percent – 4.50 percent), that is 0.75 percent. Let's recapitulate: the yearly return on the bond is 0.75 percent; its yield on maturity is 5.75 percent; its nominal rate is 5.25 percent. When the bond is given up in advance of its maturity date, its price volatility makes the investor run the risks engendered by fluctuating rates of interest. The "sensitivity" of a bond measures the

price variation for a precise difference in rates of interest. It depends on the basic characteristics of a given bond. Yearly bond returns are consequently contingent on the risk-free interest rate and a volatility indicator known in this case, once again, as "sensitivity". This time around yearly bond returns present some similarities with stock returns, since they are contingent on the risk-free rate and a volatility indicator (known as "sensitivity" for bonds and "beta" for stocks). But it is only when bond investors decide to sell their bonds before maturity that these similarities occur. And investors will not keep their bonds to maturity if they manage their investment actively and if they anticipate a change in inflation or a rise in interest rates.

Bonds may seem to entail far fewer short-term risks than stocks, but they are also much less remunerative. In France, the real buying power of a bond-based investment was divided by 2.5 between the end of 1913 and the end of 2000 (this is the case even after public bonds indexed on gold or energy are taken into account). Skyrocketing inflation in the 1950s sealed the fate of bondholders already impoverished by the two world wars. And since then, the nonetheless significant performances effected by this type of investment have not brought it back to the level of departure. In contrast to what happens with stocks, inflation has a double negative effect on bondholders.

Let's go back to summer 1999. Resurgent inflation was still dreaded. Suppose that you had invested in a zero-coupon bond with a 10-year maturity and an actuarial yield slightly below 5 percent. Inflation – 2 percent for the year – was under control. But suppose that the following year inflation rose from 2 percent to 2.50 percent, that is to say a 0.50 percent increase. The real, inflation-free return, which had been 5 percent – 2 percent = 3 percent, consequently went down to 2.5 percent. Yet for new bonds, interest rates would most likely rise by 0.50 percent, investors wishing to shield themselves from inflation. It is even quite possible that henceforth habituated to a world without inflation, investors fear that a 0.5 percent rise in the price index might possibly signify a return to the "double-digit" inflation of the 1970s. They may

demand a higher rate (and therefore a lower price) to buy bonds. When the rates go up by 0.5 percent, the price of a 10-year zero coupon bond goes down by about 4.75 percent. Over one year, the return on such an investment would have been negative: 2.5 percent (real yield) – 4.75 percent (capital depreciation) = – 2.25 percent. Were inflation to keep on rising, there would be no improvement whatsoever. The specter of runaway inflation constantly haunts this sector: it triggers rises in interest rates that rebound negatively on the price of bonds.

Sensitivity measures bond price percentage variation induced by a given variance in rates. Let's suppose that a bond with sensitivity assessed at 6.42 is quoted at 99.43 and that the interest rate rises from 5.21 percent to 5.71 percent (a 0.50 percent increase). This basic increase by 0.50 percent propels a lowering of the price by 0.50 percent × 6.42 = 3.21 percent. The price will be valued at [99.4 × (100 – 3.21)] = 96.24. Such sensitivity depends on the maturity of the bond, the level of its coupons and the level of interest rates. Maturity figures are the preponderant element, followed by the effect of the coupon, which is altogether secondary compared with maturity, and finally the interest rate levels. The longer a bond's maturity, the smaller its coupon and the lower the interest rates, the more volatile it is. Sensitivity peaks with the long-term zero coupon (of which the present-day value hinges exclusively on its repayment price). If the rates go down, current value goes up much more rapidly than is the case with a bond for which the investor actually receives coupons. The presiding logic is arithmetical rather than financial.

For a bond without a coupon, sensitivity is a trifle less than maturity expressed in years; it is almost exactly equal to maturity divided by (1 + interest rate). As a result, the sensitivity of a couponless bond maturing at 10 years is 9.6 when the rates reach 4 percent. It is equivalent to the maturity, 10 years, divided by 1.04, that is to say 9.6. If interest rates rise from 4 percent to 4.5 percent – a margin of 0.5 percent – then the price of the bond without a coupon diminishes by 9.6 × 0.50 percent = 4.80 percent. For a 20-year bond under the same conditions, sensitivity is quantified at 19 and its price declines by 9.50 percent.

The higher the bond coupon, the more sensitivity tends to lessen on maturity. A bond maturing in 10 years with a 2 percent coupon presents a sensitivity of 9 as compared with 9.9 when there exists no coupon; a 20-year bond with the same coupon displays a sensitivity of 15.8 (as compared with 19 for a zero coupon). A bond maturing in 10 years with a 6 percent coupon shows sensitivity rated at 7.8. In this case, the price should go down by 7.8 × 0.50 percent = 3.90 percent for an interest rate rise of 0.50 percent, while the price of the bond devoid of a coupon goes down by 4.80 percent. Aside from the latter, the lower the interest rates, the higher a bond's sensitivity. Interest rates do not affect the sensitivity of bonds with no coupon. As for bonds with a coupon, the influence exerted by interest rates remains restricted. A 10-year bond with a 2 percent coupon presents a sensitivity of 8.7 percent when the rates reach 8 percent (as opposed to 9, when the latter are limited to 4 percent). A bond of the same maturity with a 6 percent coupon shows a sensitivity of 7.4 when the rates attain 8 percent, instead of 7.8, for 4 percent.

These parameters are regularly used in the active management of bond portfolios. If you expect the rates to decline, which bond should be sought after? In fact, to pump up your portfolio you are well advised to invest in bonds with the longest possible maturity and the smallest coupon; ideally, you would purchase 30-year bonds with no coupon. Their sensitivity is close to 30[4]; if the 30-year rate goes down by 1 percent, the bond's price will be enhanced by 28.6 percent. In comparison, a 10-year bond paying coupons every year presents a sensitivity close to 8.[5] When interest rates vary by 1 percent, the bond price is modified by 8 percent; for a 2-year bond, this change is limited to 2 percent. You should note that such behavior by active bond managers presupposes that the bonds are not kept until maturity; the search for gains prevails. But if bond market transactions do take place, this is due to the fact that some investors divest themselves prematurely of their securities.

Once you have a "hands-on" approach to your bond portfolio, you are interested not in bond yield, but rather in portfolio return. The latter

reflects yearly bond portfolio appreciation or depreciation as for a stock portfolio. Siegel underlines the fact that the return on an inflation-adjusted bond portfolio and that on a stock portfolio tend to fluctuate in a similar way.[6] The correlation coefficient linking the two annual return rates was just negative over the years 1926–69, climbed to 0.39 for 1970–89, and reached 0.62 from 1990 through 1997. The power of bond diversification was that much more diminished: for a correlation coefficient fluctuating between +1 and −1, the figure of 0.62 reflects a strong positive correlation. However, it also means that for a portfolio, there is no such thing as a risk-free rate (at least as long as returns are evaluated on an annual basis). We have already observed that the degree of risk for a stock portfolio hinges on the length of investment. Such an approach towards bond returns nails matters down: if they are to play the role of diversification in a given portfolio, they must be endowed with maturity equal to the holding period of the latter; they must also be kept until they fall due. In other words, the risk-free rate is a return on bond investment (or on more short-term debt security) if – and only if – this security corresponds to the holding period of the portfolio and provided that it stays invested in the latter until maturity. This remark is important, although it is generally overlooked, all the more so because rates differ in accordance with the bond's maturity.

The yield on bonds possessing fewer than three years of residual life will depend on the money market interest rates, which are more variable than the long-term ones. In Europe for instance, even if there exists a relationship between the different rates (1, 3, 10 and 30 years), short rates remain pretty close to the intervention rates of the Central European Bank. Given the shocks that may be propagated by the interventions of this institution, the money market rate is more volatile than the long-term one. The vital inference to be drawn from this empirical observation is that the yield curve does not move in a parallel manner with a uniform differential for each and every type of maturity; in a word, it is deformed.

The term structure of interest rates

Market observation of interest rates shows that at any point in time, there exist differences in returns between bonds that are similar in every way with the exception of their respective maturities. The relationship between the different rates (or term structure of interest rates) can be illustrated by a yield curve, which is a graphic representation of market yields for different maturities.

The yield curve reproduces at a specified moment the interest rate structure, that is the yields according to their maturity for bonds otherwise presenting the same risk characteristics. For the sake of simplicity and a readable presentation, it is generally presupposed that the yields are determined on the basis of zero coupons repayable in fine; no repayment in advance may be envisioned. In order to respect the requirement of equal risk, yield curves are generally established with government loans. Take a look at a given curve and you will see, for example, that securities with one year to go earn slightly less than 3 percent of actuarial yield, that 5-year securities earn a little more than 4 percent, and that the yield for 30-year-maturity public securities is in the neighborhood of 5.5 percent. Why do these yields differ so appreciably? In most cases short rates are lower than long rates. But at times short-term bonds yield more than their long-term counterparts. For what reasons?

Expectation theory offered the initial – and to this day the most satisfactory – explanation of the relationships established between yields according to their maturity. It demonstrates that the relationships between short-term and long-term interest rates are determined by investors' expectations. Long-term rates are a function of existing short-term rates and of the forecast of future short-term rates. A simplified example should allow you to better understand the logic of this forecast-based theory.

Let's take two bonds, the first with two years of maturity and the second with one, and let's reason over a two-year time frame. If the yield

of the first is 3 percent and that of the second 2 percent, does the two-year bond represent a better investment? It obviously depends on how interest rates evolve. If they climb by less than 4 percent, the two-year bond turns out to be a preferable investment; 4 percent is the one-year rate of interest rendering the two investments equivalent for the holder. If next year the short-term rates reach 4 percent, purchasing the two-year bond that will earn $(3 + 3)/2 = 3$ percent is tantamount to buying a one-year bond that will earn you 2 percent the first year and 4 percent the following year $(2 + 4)/2 = 3$ percent.[7] The fact that the one-year bond yields 2 percent and the two-year 3 percent means that the market forecasts 4 percent for next year. This rate is the forward rate implied by the term structure (technically called a forward-forward). It enables bond investors to weigh the advantages of present-day yields, as opposed to future yields as they may evolve.

Let's think in terms of one year. During this year, the investor may have acquired a one-year bond bringing in 2 percent or a two-year bond yielding 3 percent the first year which will wind up falling below par. With his 3 percent bond the investor will undergo, on resale after one year, a loss in capital due to the fact that he holds a security of 3 percent yield with another year to run, at a moment when the interest rate stands at 4 percent.

Over a year, returns on the two-year bond thereby feature an unknown quantity, which is the amount of capital depreciation at time of resale. The expected yearly returns on a two-year bond presenting a capital risk have got to be greater than the guaranteed annual yield for a one-year bond. This observation leads us to conclude that the actuarial yield on a two-year bond must exceed the equilibrium level in order to compensate for, if not outweigh, the risk of capital loss. The longer a bond's maturity, the more the yield grows so as to remunerate capital risk; this occurs independently of the rates anticipated by the market. So it is that capital risk and bond sensitivity (which increases, as previously seen, with maturity) elucidate the fact that the yield curve is normally ascendant, with long rates superior to short ones.

Expectation theory also allows for explanation of yield curve *deformation*. If financial market operators foresee lower rates, the long-term market rate should be less than the short-term rate, and the curve representing interest rate structure should flatten out and take a downward or sloping profile. Conversely, expectations of heightened short-term interest rates raise the long ones in relation to the short ones; once again, the curve takes a rising profile. In summary, the gradient of the yield curve provides a rather precise idea as to the extent of the operators' expectations.

Empirical research on rate structure has shown that such an implicit rate incorporates market expectations regarding future rates. Yet these expectations do not function as reliable advanced indicators of future rates. Operators often make mistakes and may delude themselves; this is an observation we have already put forward as regards the stock market – and fine art. That said – and it does matter – the difference between the long-term yield and the short-term rate constitutes an advance indicator of recessionary risks when it turns negative.

For the American bank Merrill Lynch, there is no more proficient forecasting instrument pertaining to economic cycles than the difference between the yield on 10-year government bonds and the three-month interest rates on Treasury bonds.[8] This indicator is a forewarning: it announces a crisis or an economic cold spell a year in advance. More precisely, it forecasts a highly likely nil or negative quarterly growth rate. The model is just as applicable to the US as in the euro zone. When long rates exceed short rates by 1.5 percent, the probability of recession is about 10 percent. This likelihood reaches 40 percent when long rates are close to short rates; it climbs to 80 percent when the latter are 2 percent higher than the former.

During the September/October 1998 bond crisis, in the main OECD economies this curve had flattened out. In the UK it had actually turned upside down: at the beginning of October short rates surpassed long rates by 2.70 percent. And British industrial production indeed declined by 0.8 percent from November 1999 through February 2000.

Empirical research also shows that when long-term bonds offer a yield superior to the short-term interest rate (that of three-month government bonds), investment in long-term bonds most often turns out to be a winning strategy. This conclusion is rather surprising in so far as a highly pronounced difference indicates that the markets are expecting higher rates. And higher rates mean higher capital losses for long-term bonds. The explanation is simple and the surprise short-lived: it is not because the market expects higher rates that rates will rise. When long-term bonds offer a higher yield than short-term bonds, a long-term investment presents a good likelihood of benefiting from sizable earnings during unexpected future drops in the rate of interest. A fairly recent study shows that an investor who had invested from 1970 through 1984 in 20-year US Treasury bonds over the months characterized by a markedly rising rate curve would have earned 12.46 percent a year. Having followed the same strategy at a time when the curve had flattened out, he would have *lost* 2.57 percent a year.[9] It also appears that this investment strategy provides satisfactory results outside the US.

My word is *not* my bond

Up to now I have limited myself to government bonds; in principle, they are risk free. An industrialized country is not supposed to default, that is repudiate its signature, as did Russia in 1998 and Argentina in 2002. And yet the risk of non-payment does exist for private issuers, and even for some states.

At the beginning of 1998, investors still lent money to countries whose economies failed to present adequate guarantees and they were not truly remunerated for the supplementary risk. The previous credit crisis involving emerging nations dated back to the end of 1994. Shortly thereafter (in March 1995), the yield for the loans contracted by the latter showed a difference of 19 percent from those of the US Treasury. In other words, it cost them 19 percent more than the US to borrow on the

international markets. By August 1997, this differential had fallen to 3.5–4 percent. Did the risk incurred justify its then current price? In early 1988, one wondered whether or not it remained reasonable to put up with a 5–6 percent spread when investing in Russian bonds that had been issued by a state unable even to ensure proper tax collection! As of July 31, 1998, these bonds were graded C and their remuneration was 6.5 percent (650 basis points) higher than that of the US Treasury. As of October 1, 1998, only twice the spread (13 percent) could attract investors. Between those two dates, those who had purchased Russian bonds with a 6.5 percent spread were unlikely to draw interest for quite a while; in August Russia had suspended payment of interests on its debt. This precipitated a liquidity crisis affecting the most creditworthy of signatures. In October 1998, a private borrower rated AAA (the best rating) had to offer a yield 150 basis points higher than that of the government loans of countries in the euro zone equally rated AAA such as Germany, Austria, France, Luxembourg and the Netherlands. Is there any rational explanation for the variability of credit spreads?

A state may default, not settle the debts with which it is saddled and leave interest repayments pending. Yet technically speaking, a state does not go bankrupt. When assessing the impact of bankruptcy risk on interest rates, it behoves one to turn towards firms; unlike governments, they may go bust. Shareholders are not accountable for company debts going beyond the capital they had invested in the firm. Nevertheless, they have the right to put the latter into bankruptcy once it can no longer repay its debts.

Consultancy firm KMV has applied the theory of contingent claims analysis that was initially elaborated by Robert Merton, who in 1997 was awarded the Nobel Prize in Economics, to measure the credit risk premium. Matters proceed as if shareholders were endowed with both a buying option on company profits and the right to institute bankruptcy proceedings through which the company's assets would be sold off. The position of creditors may be compared with that of the seller of a put: they have ceded to shareholders the right to put the company into

bankruptcy if it becomes insolvent, that is if it cannot repay its debts, or equivalently if the value of assets falls below the value of debts. In exchange for this put, creditors are awarded a premium, the interest on the loan granted to the firm. The greater the risk of company bankruptcy, the higher this premium.

Like all option premia, this premium depends on the strike price, the price of the underlying assets and the volatility of the latter. The value of the risk premium hinges on three factors. The first (the strike price), quite understandably, is the total amount of debt. The second (the price of the underlying assets) is the market capitalization (stock price multiplied by number of shares) and the third is the volatility of that share. The option of putting the company into bankruptcy is an option of selling it off to its creditors, which more precisely means placing the company at the disposal of a court that will compel the sale of company goods and assets so that the creditors can be partially repaid. Shareholders will exercise this option if the value of these assets falls below the value of debts contracted. The strike price of this option is the debts' worth. The underlying asset of this option is the value of the firm's assets. The volatility of the option is that of the assets. The more closely the value of the company's assets reaches the value of the debts, the greater the risk that shareholders will exercise the option of making the company bankrupt. The interest in this approach has to do with the way in which the volatility of the company's assets is taken into account. The higher the volatility of these assets, the greater the risk of bankruptcy and the higher the price of the option sold to creditors. The higher the volatility, the higher the premium for credit risk.

The quality of an issuer is measured in terms of its credit *rating*. The grade is given by specialized agencies such as Standard and Poor's, Moody's and Fitch. They have the power to draw up a "report card" on companies based on analysis of their financial statements, their field of activity (and its prospects), their competition and their qualitative management performance. These organizations are also beginning to use models similar to those of KMV.

The more optimal the issuer's "health", the higher its rating: AAA crowns the cream of the crop. The higher the degree of risk, the lower the grade awarded: AA, A, down to BBB for the least creditworthy of borrowers. When descending beneath BBB, we encounter non-investment grade, high-yield and, at the bottom of the barrel, junk bonds. Bonds estimated under BBB– are non-investment grade. They present a risk of failure very much higher than those deemed investment-grade (from AAA through BBB–). This risk had to be remunerated, and so it was that as of September 1999, such bonds offered a yield 2 to 3 percent greater than that provided by government loans. This sort of investment may be interesting in the event that economic growth picks up and favors the improvement of company finances. The credit spread goes down, bond prices go up (a great deal). But then again, the opposite proposition is equally true. We saw what it cost LTCM.

In 1998, the issuers receiving credit ratings were generally multinational companies, of which 2,873 were American, 150 British, 105 French, 85 Japanese and 38 German. But along with globalization, ratings have rapidly burgeoned. When Europe was just a mosaic of small countries whose investors tended to invest in their national currency in order to avoid exchange risks, ratings presented scant interest. With the arrival of the euro, investors can invest in instruments emanating from foreign firms, and ratings assume capital importance in bond investment.

Up to the 1999 introduction of the euro, the European market remained dominated by bonds rated AAA, the optimal grade awarded to government loans and to only a happy few private issuers. In Europe the BBB bond market was rudimentary: it presented 10 percent of bond issues (as opposed to 60 percent in the United States). The diffusion of ratings represented a major change. Their development is paving the way towards a market for bank credit in Europe.

A bank's credit portfolio is not always the intended result of a rational and wholly voluntary choice. It more often stems from the opportunities offered by the market and the commercial efforts of

its sales team. The skills acquired by corporate bankers in specific industrial sectors or geographical areas may impel the bank to put all its eggs in one basket as it concentrates on some customers or types of borrowers.

Wanting to obtain a portfolio in harmony with the objectives of risk and return set by management, banks are steadily more inclined to sell their loans. This technique delivers them additional flexibility. It enables them to restructure their balance sheets and facilitates credit management. Once the secondary market for commercial and financial receivables had appeared, the main objective of banks, which were its initial coordinators, was to restructure and recalibrate their portfolios by dint of sale and purchase of loans.

The secondary credit market came into being in 1983, at a time when the indebtedness of developing countries was reaching crisis level. Banks readily detected the possibilities offered by this new market to optimize management of their loans to Latin American countries in accordance with the credit risks they perceived. This explains the appearance of highly different discounts, their size depending on the credit status of the debtor. It was not uncommon at the time to obtain discounts exceeding 60 percent of the credit's nominal value. This secondary market allowed some banks to clear themselves of credits that they felt would never be repaid. Some institutional investors and specialized funds (sometimes known as "vulture funds") purchased the distressed properties at bargain prices; they expected the debtors to improve in creditworthiness. The market took on new life in 1990–91 with the negotiation in the US of slightly or non-discounted credit. Today the deep-discount variety represents just 10 to 25 percent of trading.

The secondary bank credit market indeed developed in Europe and it now represents nearly half the US market. The proliferation of such markets brings into focus something fundamental: debts bear steadily more resemblance to stocks and the mechanisms of debt valuation are more and more akin to those used for stocks.

Between debts and stocks there thus exists not a border but rather a continuum, fadeout or "lap dissolve" (as moviemakers would put it) permitting the insertion of bonds convertible into stocks. A convertible bond is a hybridized security issued by a company quoted on the stock market. It is first and foremost a classical bond debt characterized by a face value, a maturity, a redemption price and a periodic (usually annual) coupon defined by a nominal interest rate, which may be either fixed or variable. This bond is associated with an option (the hybridism of this financial instrument is thereby explained) endowing the investor with the right, during the conversion period, to change it into stocks. The conversion ratio provides an indication of the number of stocks that may be acquired in the trade-off with the convertible bond. This is also known as exchange parity. The conversion period is specified in the issuing contract. It comes to a close once the convertible bond is repaid and commences, generally speaking, at a date after its issue.

Let us summarize. When you purchase a convertible bond, you simultaneously acquire a bond and buy an option on at least one stock. Convertible bonds constitute a peculiarly attention-worthy class of assets. They enable investors to benefit from the advantages of fixed-income securities and equities; at the same time, they are spared the risk of lowered stock prices. Once the stock price has reached a certain level, the price of the convertible bond increases in practically the same proportion as the price of the stock. In the event that stock prices decline, convertible bonds behave as would ordinary bonds and offer minimum income by dint of the coupons. The impact of the fall is attenuated by the fact that it is possible for the investor *not* to convert his bond into stocks. Unlike the latter, convertibles shield him from the eventual danger of price downturns.

The guaranteed minimum income and the optional nature of the convertible bond, which allows the investor to win when the market is thriving yet not lose when it is sickly, are advantages from which he draws profit. That said, there is no such thing as a free lunch. When you wish to purchase an option, you have to pay a premium. This premium is

included in the price of the convertible, but it is not made explicit. Two basic elements determine how much it amounts to. In the first place, its yield is lower than that of a classic bond processed by the same issuer. In the second place, at the time of issue the price of the convertible bond is higher than that of the stock.

An original product, as readily adapted to a firm's financial management as to individuals' savings management, the convertible bond is a product offering a telltale reflection of the advantages and the potential procured by the association of derivative products (the option) and traditional instruments (the bond).

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The issuers of financial instruments

The first serious issuers of financial instruments were states with their public debt. It was only later that firms came to play a role as capitalism first took shape, most notably with the development of long-distance sea-borne trade at the time of the Renaissance. And it was only during the Industrial Revolution of the eighteenth and nineteenth centuries that the appearance of the joint-stock company created a legal framework allowing for widespread expansion.

Capitalism or capitalisms?

One of the first instances of a public stock issue may well have been that of a London firm going by the mellifluous name of The Mysterie and Compagnie of the Merchant Adventurers for the Discoverie of Regions, Dominions, Islands and Places Unknown in 1553. The industrial project consisted in discovering a seaway leading to Russia. No such "privatization" had previously taken place. Up to then, exploration had been a public service ensured by the Portuguese marines under the aegis of King Henry the Navigator; it was a matter of discovering a passage to India via the African coast. Prince Henry of Portugal (also known as "The Navigator") instigated the finding of new ocean-based routes to the Orient. It was in Sagres (Portugal) that he founded a navigation school and sent out reconnaissance expeditions towards the West African coast

in search of an itinerary culminating in the Far East. In 1492 the kings of Spain "outsourced" such activities to none other than Christopher Columbus. That said, the discovery of America was also financed by the royal Treasury, not by private investors. The "Russia" project financed by a consortium of London-based merchants turned out famously well: one of the three ships managed to reach the court of Ivan the Terrible and returned home with a treaty granting England the right to trade with Russia. The enterprise went on to rename itself the Muscovy Company and made a killing on the stock market.

We should also recall the essential role taken on by the Vereenigde Oost-Indische Compagnie (United East India Company) founded in Amsterdam in 1602, whose publicly diffused capital was quoted on the stock market at the start of the seventeenth century. Endowed with wide-ranging powers – it could go to war with Spain in India and pay the bills – the VOC paved the way for the Dutch colonial empire and secured it a monopoly in the spice trade. While in the East the Dutch were supplanting the Portuguese, the English were showing an interest in India. In 1600 a charter was accorded to an English company; nine years later the latter had equipped only fourteen ships to effect five expeditions, whereas the Dutch were arming a flotilla of comparable dimensions every two years. In 1609 the King of England (James I) bestowed a new charter on the East India Company and granted it a monopoly concerning English trade with the Orient. The shares of this company were quoted on the London Stock Exchange. Following in the footsteps of the Portuguese, Dutch and English, the French came to India in 1654, at which time Colbert created the Compagnie française des Indes orientales.

All these state-run companies were capital based and benefited from special authorization from the sovereign to wage war in his or her stead. They were the only companies in a position to raise substantial funds. The authorization of the sovereign was important when going public and going to war in his or her name. In 1711, for example, the French mariner Duguay-Trouin created a commercial company and called for funding by

the great names of the kingdom in order to finance the storming of Rio de Janeiro. At the head of a squadron whose armaments had been financed by his shareholders, he took over Rio on September 20, 1711, set 60 merchant ships on fire and imposed on the vanquished city a ransom high enough to allow him to remunerate his shareholders. Twenty years later, the corsairs of Saint Malo likewise financed their buccaneer raids by going public and issuing stocks. The King of France organized acts of legitimate piracy against merchant ships commissioned by enemy powers. The corsair received the authorization of the Admiral of France. Against this, he had to share his booty and the "earnings" from his sale of captured goods: one-fifth for the King, one-tenth for the Admiral of France, two-thirds for himself, and the rest for the crew.

The financing of such expeditions required the invention of the notion of a *corporation*. Partnerships were the corporate structures that allowed some adventurers to pool their skills and capital to undertake expeditions in faraway lands and share gains or misery. Traces have been uncovered in Venice, Italy, of contracts binding a financial associate and a mariner, dating from around 1072. The financier provided two-thirds of the capital necessitated by the expedition while the departing seafarer furnished not only the remaining third but also himself, his skills and his life. The company functioned for just one voyage and the associates shared out the profits, if any, on a 50–50 basis. The individual associates contributed a great deal to the constitution of these companies; they were indeed partners. In the case of limited partnerships, the general partners were personally accountable for any joint debt.

At the opposite end of the spectrum, one might note the existence of public limited (or "anonymous") companies in which the personalities of the associates, known by then as shareholders, did not matter in the least. Only capital contributions counted; stocks could be negotiable in so far as they were *dissociated* from the person of the associate. The concept of liability limited to contributions goes back to Roman jurisprudence; that said, over many centuries associates basically took company debts to their

own account. Only in Florence, in the early sixteenth century, was the notion of a societá en accomandita brought into being in which all the associates were not personally accountable for any joint debt and all they were liable to lose were the sums of money they had invested in the association. This idea prefigured what came to be known as the limited liability company.[1] This played a paramount economic role to the degree that it confined shareholder responsibility to capital contributions. It may be found today under the appellation "anonymous" in manifold instances of legislation (Belgium, France, Spain, the Netherlands, Switzerland, countries of Latin America and so on). The adjective anonymous translates the relative indifference of the company to the personal attributes of its shareholders. In this type of endeavor, associates are only liable to a loss of the total amount of their shares. That said, no anonymous undertaking could get off the ground without government agreement or approval. In fact, it was only in New York in 1811 that a new statute of the joint stock company saw the light of day: it was open to one and all and losses were limited to contributions. The other American states followed suit; in 1855, this legal innovation was adopted in England. A joint stock company is a means of raising funds from a wide-ranging public comprised of passive investors. Such companies exist only when these stocks are not only transferable, but also negotiable on the market. We should once again note the primacy of liquidity, that is the capacity of a good to be transformed into currency in the nick of time and without sacrifice in value.

Today, joint stock companies have evolved into the principal issuers of securities. Unlike the state, they issue equities as well as credit instruments. It should be added that when a firm issues bonds, its indebtedness grows, whereas when it issues stocks, its capital increases. It is evidently possible for a company to finance its investment through stocks, bonds or loans; one wonders whether there might not be a perfect combination. Financial studies have shown that this cannot be done. So what are the conditions under which a firm may create optimal worth for the shareholder? The answer is that this does not depend on the financier; we will return to this point later.

Capitalism is characterized by the private appropriation of the means of production and the decentralized – legally autonomous – decisions taken by firms; they lead to contracts, to the freedom to devise and sign them. Capitalism is thereby identified with the market economy. History has been punctuated by the creation of various types of organization for production and services. There does not exist a single and selfsame form of business law that would be applicable at any time and in any place. Rather, there are different sets of rules concerning companies that could not be brought into a unitary schema. Some have dwindled and been replaced by others; some have survived and still exist. That is because they respond to genuine necessities – Darwinism is not reserved to animal species.

Therefore we may distinguish administrative structures that are supposed to render a service to users, most often without worrying about the costs, which are borne by the state. When these forms of organization do keep a close eye on the expenses entailed by their interventions, they become "non-profit" companies (which frequently function in the cooperative sector). Once we look at *for*-profit activities, we find capitalist companies based on capital accumulation: reinvestment of the profits registered by firms is designed to engender exponential growth in production capacity. The power to take action and to make decisions, the capacity for risk and innovation buttress the superiority of capitalism over other means of production. In our times, governments have been ceding more and more of their prerogatives to profit-making institutions. In France, prisons had from time immemorial been an attribute of the state; in the 1980s they came to be run to some extent (and behind the scenes) by private companies.

Let's look into this a little more closely. These commercial firms correspond, given the origin of the capital, to several modes of private enterprise: the neo-rural capitalism of professional corporations in Europe or India during the Middle Ages, the state-based capitalism characteristic of Colbert's seventeenth-century France (its obituary would be premature), ever-vivacious "mom and pop" capitalism, the

heavy industry variety illustrated by Henry Ford at the start of the twentieth century in the US. Each of these forms crystallizes both the potential and the tensions belonging to a set of techniques, a social structure, an aggregation of shared beliefs and social representations. Over the twentieth century we could observe the predominance in different countries of state capitalism (France), Rhine or mixed stakeholder capitalism, the managerial capitalism of the 1950s in the US, the *keiretsu* (Japan), the *chaebol* (South Korea) and even the online (Internet) firms dating from the end of the 1990s.

Capitalism features untold variations on a single theme. They are essentially differentiated by the extent to which the state plays the controlling role in the economy. The state is present in any event: no market economy could do without it. By the end of the twentieth century economies had thrown in their lot with market capitalism. That said, in the world at large in the early twenty-first century, the basic capitalist model does not necessarily predominate. In France "Rhine capitalism", characterized by close links between banks and industry, co-management (bosses plus unions) of firms and meager financial markets, is routinely placed in polar opposition to Anglo-Saxon capitalism, which is said to give precedence to quarterly results and shareholder omnipotence. Some economies belonging to the OECD have been functioning for quite a while in accordance with this model of market capitalism: the US, the UK, the Netherlands, Canada and Australia. In these countries, newly founded firms can readily gain access to domestic or foreign capital and either enter into or exit from numerous fields of endeavor without having to encounter insurmountable roadblocks.

Other countries display a rather "corporatist" model; one may cite (in the euro zone) Germany, Austria, Italy and France, without failing to mention Norway and Sweden as well as Japan, the second contemporary economy. They are characterized by a fairly closed system of big companies and big unions tightly supervised by an interventionist government, with the help of the major banks. Financing of firms by the latter helps to explain the relative weakness of the financial markets. In

these countries, governments increase public-sector employment, heighten public expenses and reinforce social control over the private sector. Economies that had persisted in such practices through the 1990s did not experience the altogether exceptional investment surge observed in the more capitalist-inclined countries. All of this is presently changing: Germany offers a striking example. The ties between the banks and industry have become distended. In this European behemoth there were more IPOs from 1995 through 2000 than over the preceding half century; as for the formerly all-powerful metallurgical union IG Metall, in the same five years its membership diminished by a third. In 1990 Germans believing in UFOs most likely outnumbered those wishing to fund their retirement through the stock exchange. In today's Germany there are more shareholders than trade unionists. The country finally boarded the train entailing deregulation, less state interventionism and more free enterprise.[2]

Just like the markets themselves, market-based capitalism has benefited from the effects of new technologies and globalization. These two factors open up options for individuals and allow businesses to perform better and be more creative. The new technologies have refocused the company and its corporate ethos towards the markets and contractually established relationships. As for the term "globalization", it designates one of those great transformations, propelled in the 1990s by the geopolitical framework and the sanguinity engendered by the crumbling of the Soviet colossus, which brought together internationalization, deregulation, revolutionary advances in computer-based and biotechnology and – last but not least – a rehabilitation of the markets' role.

We are entering the age of choice. Whereas large-scale industrial capitalism based on mass production limited choices in the name of cost-effectiveness (do you remember Henry Ford asserting: "You can have a car in any color, as long as it is black"?), the new means of production favor both freedom of choice and lower manufacturing expenses. Consumers may pick and choose among numerous products, manufacturers among a large number of suppliers, investors among many types of financial assets. It

does bear mentioning that the shock waves emanating from the American mini-depression – multiplied by the consequences of the September 11 terrorist attacks – gave global capitalism a foretaste of overall crisis. Yet it withstood this better than had its predecessors: the henceforth pre-eminent role of the markets surely made an appreciable difference.

Professor Edmund S. Phelps (Columbia University) and Gylfi Zoega have put forward the hypothesis that stock market fluctuations, an indicator of variations in expectations, might also be one of economic expansion yet to come.[3] Stock prices would provide a "sneak preview" of firms' attitudes and anticipations. Many elements go to show that stock price decline generally precedes the progressive aggravation of unemployment. Since (at least) 1900, there has existed an irrefutable long-term correlation in the US and the UK (and also in France, where it was only observed later) between stock prices and employment. Since 1960, available figures for the countries belonging to the OECD demonstrate that the same statistical link may be postulated everywhere, Sweden excluded: the higher the stock prices, the lower the rate of unemployment. Of course, the relationship is stronger in some countries than others. Statistical elements tend to prove that a variation in market prices is followed by a more pronounced upturn or downturn in employment in Anglo-Saxon capitalist countries than may be the case elsewhere. Here as always, it remains to be seen which is the chicken and which the egg, stock prices or employment.

As for Rhine capitalism, it confers the lead role on banks and indebtedness. Each time businesses heighten the proportion of their debt to their overall resources, they render employment that much more fragile. Loaned resources are necessarily precarious: they quite naturally correspond to the employer's desire to reduce the proportion of permanent employees. But there is also another, more fundamental reason: a firm needing to borrow sees its fixed financial expenses going up. So it is that payroll devolves into a front-line adjustment variable. A strongly capitalized firm displays entirely different behavior: it is capital as such that absorbs first-hand the economic ups and downs.

Corporations provide their owners with a whole array of built-in advantages, including that they are not responsible for the acts committed by the company or its employees and they cannot possibly lose more than they have invested. In return, the capital holder may not give orders, his approach may not be "hands-on", if he is dissatisfied he votes with his feet and sells. However, in family, managerial or state-run types of capitalism, the shareholders are sufficiently concentrated and the owners unique enough to impose their will by "making heads roll". The managers are beholden to the family or the state; they are eminently replaceable. In large managerial undertakings, professional senior managers belong to the corporation and have their decisions carried out. This is *not* the case with market-centered capitalism. As company owners without powers, pension funds and other institutional investors had to impose a number of counterweights on the directors of quoted companies, which comprise the governing rules known as corporate governance.

If corporate governance requires rules, it also revolves around a state of mind: the decision-making process has to incorporate mechanisms ensuring checks and balances between all company stakeholders and efficacious oversight of managers. It is important to go beyond the literalness and appearances of procedures (committees, charters and so on) and give priority to the spirit of governance. On one hand, the accountability of managers, which is at once their *raison d'être* and their badge of honor, must remain all-encompassing. On the other hand, monitoring is only meaningful when conducted by fully competent and truly independent directors and committees. The scandal of Enron is a case in point.

Yet something of a juggling act remains to be performed. The respective interests of shareholders and management have to be aligned effectively. Unfortunately, all means for ensuring such dynamic alignment are asymmetrical: they may work in one direction, but not in the other. You will not be astounded to learn that just like any option, a stock option is asymmetrical. Stock option plans align the interests of

managers and shareholders when prices are rising. What happens when the latter dip and dive? In fact, while management is immunized, the shareholders alone endure the ensuing losses. Not so long ago it was rightly said:

> It is possible to argue that share options provide an incentive to managers that is diametrically opposed to the long-term interests of shareholders. The main reason is that stock options leave recipients free to buy or not to buy. If things go swimmingly, they will; if something goes wrong, they are free to pass, whereas shareholders may have to sell at a loss. Managers with options thus have every incentive to shoot for the moon.[4]

It is exactly the same with the ebb and flow of information required for everyday market functioning. The information asymmetry between managerial "insiders" and investors is the main reason for limited market efficiency and periodic market crises. It is curious to note that while simple solutions remain on the back burner, practitioners still have recourse to asymmetrical techniques. Rather than issue employees with stock options whose effects in accountancy can be somewhat arcane, a firm ought to proceed to substantial repurchase of stocks on the market (along with full disclosure of all relevant information pertaining to the latter). It would thereby publicly confirm that its board of directors was in agreement with its management team as regards company prospects and, more particularly, its stock market valuation. Rather than allow top-level managers to determine their own salaries under the ostensible supervision of reputedly independent administrators, it would be better for the company to have such remuneration duly voted on at the general shareholders' meeting.

Corporate governance is neither – as is frequently imagined in Europe – a patently unfounded ideological model nor a weapon-brandishing class struggle or mass pauperization. In fact corporate governance is a means of rendering managers accountable to shareholders within the framework of market-driven capitalism. It has got to be continually

ameliorated through value creation. At the same time, governments subject companies to increasingly constraining societal rules and regulations such as respect for the environment and removing inequalities. Corporate managers must harmonize money-making efforts with ever-changing state-mandated restrictions. The "big boss" pitches and tosses; he is in a quandary. The industrialist will never again reap the predictable fruits of peace and quiet (thus spoke Andrew Grove, one-time Intel CEO, in 1997). It is glaringly evident that the ingredient that matters most is not the mass of available data, but rather the reasoning of the decision maker, along with his ability to pinpoint the pertinent piece of information.

Managing for value

An enterprise's value corresponds to the market value of its economic assets. It is equal to the sum total of the market value of equity capital (stock capitalization if the company is quoted) and the market value of net indebtedness. Market capitalization is not the fundamental value – as we have seen, there is really no such thing as fundamental value – but there does exist a fundamental question: for whom should the corporation create value? As regards value creation, we may note the existence of two schools. One sees it in terms of the firm, its employees, its shareholders, its future; the other limits itself to generation of value for shareholders. If European capitalism adheres to the first model, its Anglo-Saxon cousin is rather inclined towards the second. The debate has yet to be resolved. Even in Europe, it is more and more widely recognized that value creation for shareholders serves as a guide for action without thereby constituting an all-purpose end.

In contrast to what certain intellectual fashions may lead us to believe, there are actually not so many differences between the interests of the shareholder and those of the employee: it is not possible for a firm to create value for its shareholders if those who are supposed to

contribute to its proper functioning are on the sidelines, pouting and sulking. More specifically, in a world where human capital is harder to garner than financial capital and evolves into the main source of competitive advantage, it is absurd to oppose value creation for shareholders to that meant for employees.[5] Human resources remain at the heart of gains in productivity; labor is the first factor determining the wealth of nations. As is seen in today's France, when the work week is reduced, potential growth is dampened and the economy impoverished. So it is important to take into account, even and especially in corporate governance, the dynamics of labor (as well as those of capital). The true value of a company is due to an ever-greater extent to factors extrinsic to assets and other components of its balance sheet. You must factor in not only the value of those working in the firm, but also (at least as much) the trust the firm has managed to establish with its customers. All of these elements form part and parcel of its image, its brand name, its products and its innovatory talent. True competition has a great deal to do with headhunting: a company must recruit the best and keep them on board. The source of value creation is the existence of a durable competitive advantage. It is the role of the management of the firm to define the means to attain it.

However, how are we to define the right strategy, how are we to make the best choices involving the future? Finance claims to be pertinent in this. If the goal of the corporation is to create value for its shareholders, investments are to be made once the value that one may attribute today to the flows they will produce is greater than the outlay to be accepted. If investment profitability exceeds the returns required by the shareholders, the value of the company is (supposedly) instantaneously heightened. If such profitability is merely equal to the required returns, there is no creation of value. And if the former is lower than the latter, relative impoverishment ensues. In all cases, the rate of return required by capital contributors plays an essential role in the orientation of the company's industrial and commercial tools and assets. This rate represents what capital costs the company; it is a benchmark for performance.

The cost of capital reflects the many means of financing utilized by the company; they may include new equity issues, retained earnings or outright indebtedness. The cost of debt is easy to assess. It is tougher to assess the cost of equity capital, whether new equity or retained earnings. The financial markets put value on invested capital; rating agencies rate debts, the exchange quotes shares and bonds and, last but not least, the financial market is said to allow for evaluation of the required returns (given the risks incurred by the company). When striving to measure the cost of equity, economists give credence to the Capital Asset Pricing Model (CAPM) discussed earlier, which is better adapted to portfolio construction than to tailor-made analysis of a given company. That said, a more accurate translation of stock price volatility into rates of return has yet to be found. The reasoning is as follows.

The rate of return required by the shareholder should be higher, the higher the risk of his not obtaining it. And if company profitability does *not* exceed the required rates, the shareholder will head for the exits. As the financial investor who has purchased stocks fails to register the hoped-for return on investment, he sells until he has lowered the price of the stock. This value declines up until the point when the expectation of returns equals the required rate. So it is that the stock market assesses the required rate of return. But one remains dubious about this type of "valuation": it is after all based on the fundamental value and as we have seen, when employed as an explanation for stock prices this is fundamentally flawed.

The fundamental value simply translates (into financial terms) the future flows that are forecast at a precise moment; it takes into account the cost of time and also the cost of risk as of then. It is simply a way of compressing forecasts; when this is done, the results largely depend on what has been put into the compressor. A significant reduction in fundamental value results from the reduction in the growth rate. A company growing quickly – each year its financial cash flow doubles – will have its fundamental value decline by three-quarters (75 percent) when its growth rate goes down by just a third (33 percent). With an

orthodox growth model, in which yearly growth is calculated in single-digit percentage points, growth declining by a third entails a loss of value neighboring only 10–15 percent. This point is never sufficiently emphasized: the growth rate is the major ingredient constituting fundamental value, which hinges on expectations. Each observer involved projects differently; one schema is no more apt than another when envisioning market prices. Value analysis by cash flows presupposes their predictability. This entails measurement of three parameters: sales growth, operating margins and investment spending. Within this model, sales forecasts have maximal impact on results. As for the sensitivity of value to changing turnover prediction, it is that much more important in so far as the growth rate implicit in stock prices is higher. Alfred Rappaport and Michael J. Mauboussin made the following calculation: if the sales of Cisco were to be modified by 20 percent, its value would fluctuate around 34 percent (as for Home Depot, it would vary by 40 percent), whereas the worth of Procter and Gamble would be altered by just 18 percent.[6] The key to all of this is purely arithmetical: given growth rates highly superior to discount rates, any diminution of expected growth rates brings about a more than proportional lowering of valuations.

The other component of fundamental value is the rate of discount for future cash flows. The rate reflects the cost of the resources that the firm brings to bear in order to finance its upcoming growth. Is a loan less expensive than capital or vice versa? When we make reference to an income statement, the answer is unequivocally clear: capital costs less than debt in so far as, in contrast to dividends, the price of a loan diminishes benefits. The dividend paid to shareholders is a way of "earmarking" profits; it does not reduce them.

Nevertheless, if your vision takes you beyond the accounting mirror, it becomes evident that the dividend is a form of remuneration payable to shareholders, and that its "ladling out" may turn out to be a burning obligation. When, during the summer of 1958 in the US, mean dividend yield (which is the dividend-to-price ratio) became lastingly inferior

to interest rates, commentators reacted as though confronted with darkness at noon.[7] If stock remuneration were to be lower than that accorded to debt, wouldn't investors consequently turn away from stocks? The answer is well known: investors demand not only a yield in dividends on their stock investment, but also a growth in profits forming a foundation for the higher prices. The cost of equity capital corresponds not only to dividends but also to capital-based appreciation, that is to total shareholder return. When defined in this manner, this cost of equity is greater than that engendered by debt; the return rates the shareholder hopes for are higher – because riskier – than interest rates. In this theory, the shareholder is supposed to formulate a required return, which includes gains on his stocks and the dividend flow he will collect during his investment.

This picture does not correspond to reality. It is not in this way that a shareholder formulates his hopes for – and expectations of – returns. But then again, the idea that equity capital has a cost is altogether correct. It corresponds to what a firm needs in order to make sure it grows. Let's set that aside for now, however, and adopt the idea that capital is by no means tantamount to a free lunch.

How are we to measure value in this context? Economists employ four parameters in all possible combinations and permutations: two of them measure company performance (the market value of its stock, the return on assets); the other two assess what was expected of it (capital employed, the cost of capital). Two rates, two values. The consultancy Stern Stewart now specializes in this type of quantitative yardstick and it has developed two measures of value creation, the market value added and the economic value added. At a given point in time, *market value added* (MVA) measures the degree of value that the firm has created. It is equal to the differences between two values: what investors have invested (capital + debts) and the money they could make by selling off the firm (market value of equity + debts). For quoted companies, MVA represents the difference between the value of the firm on the stock market and the historical accounting-based value of shareholders' funds.

Since one value is fleeting and the other out of date, how could MVA have any real meaning?

Economic value added (EVA) compares the two rates of return on assets and cost of capital. It is based on an indicator of economic profitability known as ROCE (*return on capital employed*). It is equal to after-tax operating income divided by economic assets (at the start of the time period under review). Financially speaking, the objective of any company consists in creating value, that is in being able to effect investments of which the rates of return achieved are greater than the rates of return demanded with the risk factor taken into account. If a firm is to create value, it can do so only once the economic returns exceed the average weighted cost of its capital. It is only when it generates remuneration superior to what its shareholders demand that it creates value for the latter. The EVA is the supplementary value brought into being by the company after repayment of its sources of financing. A firm achieving *ex post* returns on its investments equal to the average weighted *ex ante* cost of its capital would fail to generate any EVA. As for an enterprise limiting its investments to projects whose present-day net value would be equal to zero, it would be no more likely to create any EVA.

EVA is an excessively stringent benchmark. That said, it is also – as is equally the case with net present value – a flawed means of measuring value creation. It fails to factor in contingent cash flow, whose actual realization depends on future decisions. This is to some extent comparable with the opposition of the computer and the chess master. Just like predicted cash flow, a computer foresees all the consequences of a move on the numerous future steps. The great master senses the value of a move in terms of overall game strategy; he clearly perceives each and every option. His finesse enables him to see the fine print and connect the dots. Company strategy is that of the master; net present value is that of the computer. It is the same for EVA: it is wanting in finesse.

The value of a company hinges not only on projects already launched, but also on the value of the options it holds (e.g. a patent endowing the

firm with the right to exploit a market), that is the potential conferred by its competitive edge. Analysis by options resorts more to the spirit of finesse than does present value or EVA. This is (in a way) what stock prices strive to measure, but they do it superficially, from one day to the next.

A final way of seasoning the same basic ingredients consists in comparing the yearly total rate of return obtained by the investor with the yearly cost of equity capital over a period long enough to level out momentary market hiccups. The first rate is total shareholder return (TSR) for a set length of time (five years); the other is the cost of equity capital, the minimum rate of return required by the shareholder (supposedly) when investing. Stern Stewart has established a Wealth Added Index (WAI) to classify the 5,000 largest quoted companies.[8] From June 1996 through June 2001, the top three were General Electric (which had created $226 billion in five years), followed by Mannesmann ($220 billion) and Microsoft ($149 billion). After that, value making rather precipitately plunges: rated number 43, Siemens generated 10 times less worth ($24 billion) than General Electric. As regards value destruction, you will not be surprised to learn that among the telecommunication companies, Vodafone comes in last ($144 billion went up in smoke), with ATT ($137 billion down the drain) and Lucent Technologies ($100 billion) hot on its heels. As for Coca-Cola, $86 billion worth of riches were turned into rags!

What, in that case, is the interest of the methodology under question? It is a matter of coming closer to the long term necessary to portfolio diversification. Of course five years is an insufficiently long time. That said, even when examining just half a decade, the analyst manages to assuage the volatile valuations of the financial market. The other source of interest consists in calibrating strategic decisions with finance-based benchmarks and yardsticks. I just mentioned that Vodafone destroyed a maximum amount of value, while Mannesmann ranked third in value creation. Yet it was Vodafone that subsequently bought Mannesmann. It is evident that mergers and acquisitions (M&A) are profitable for the

shareholders of the acquired companies, at least if we limit ourselves to the rather narrow measurement represented by the wealth added index. But the WAI, like all measures of value creation, comes up against a formidable contradiction.

A firm's value-creating capacity depends on its ability to surprise its financiers happily, which means permanently showing economic profitability greater than the cost of its resources. When they are used to being happily surprised, investors want more. Zeno's famous paradox is in a way implicit to value creation: when a firm succeeds in creating value, the return rate required by the shareholder grows correspondingly higher.[9] So a firm creating value is not seen as doing so by these yardsticks. How can a business yielding returns higher than the cost of its resources maintain this surplus profit? The problem has yet to be resolved; once boundaries are overturned, one may jump at will.

The method of fundamental value is prone to failure when put into practice. There is no consensus on two figures essential to its measurement: future cash flows and the cost of capital. That is why these fundamental values cannot be reduced to stock market prices. The most one can say is that the many fundamental values held by investors at any moment help to explain the instantaneous variations in stock prices. It is somewhat paradoxical that a methodology the value of whose two main parameters cannot be assessed with exactness (which is an understatement!) plays a fundamental role not in the day-to-day explanation of prices, but rather in the framework of company management decisions. It ought to be perfectly clear that today's company is more interested in the economic profits it registers than in the simple upward movement of its sales. Thirty years ago, it was deemed necessary to explain to company executives that their objective should not consist in spending more on the latest machines or the amplest of stocks. In a cartoon published in the *Wall Street Journal* at the start of 2002, the reader could see a 50-year-old boss saying to his son, most likely a Wharton graduate and his groomed successor: "Your grandfather spoke about increasing sales, me I wished to make a profit, you shall be in the business of value creation." Fundamental

value and the orientation of value creation management will at least have served to set such matters straight.

Fundamental value, however, plays a primordial role in rare and cost-consuming transactions. An investor is interested in more than simple stock quotations: when appraising a firm, he is thinking in terms of buying it up, what we call M&A (mergers and acquisitions). Such fundamental value will henceforth be termed "enterprise value".

Enterprise value

Keynes wanted to appropriate the term speculation for the activity of forecasting the psychology of the market, and the term enterprise for the activity of forecasting the prospective yield of assets over their whole life. Stock market prices hardly represent the latter.

In a period of market euphoria (as was the case at the end of the 1990s), or at a time when some companies show skyrocketing growth rates, the two-to-three-year periods of noted or predicted growth rates have always been subject to highly long-term extrapolation. We have already observed that in the middle of 2000, quoted prices of companies in sectors connected with the "new economy" entailed the assumption of sustained flabbergasting growth. The growth rates of Amazon's sales justifying its stock price were in the neighborhood of 80 percent a year for 10 years!

Let me once again remind you that at any point in time, this quoted price is an expression of the incongruity of two highly subjective points of view: the seller is persuaded that the true value is lower and that prices are bound to go down; the purchaser's opinion is diametrically opposed. In fact prices are submitted to a sort of tug of war involving these two temporary standpoints: they are expressed second by second in perpetual back-and-forth motion. Investors' outlooks may be put forward in terms of fundamental value, but fundamental value is hardly the most objective of notions. Each market participant tends to privilege one such value: his own.

There is an instance where enterprise value in Keynes's sense plays a role: in M&A transactions. When one wishes to purchase the totality of company stock, in my opinion the ensuing transaction markedly differs from the purchase of a few – and not a slew of – shares on the market, where the buyer and the seller are at loggerheads concerning the way the wind will blow. Contrary to stock market quotes, in mergers and acquisitions, transactions may quite possibly be evidence of a basic agreement on the value of the firm involved. The acquirer wishes to submit the company to his "big-picture" strategy; he thereby justifies the price he has paid. A merger may allow a given company to benefit from the transfer of technical know-how, synergy, economies of scale, access to newly opened markets, better finances of the acquirer, vertical market integration and a better market share after combination of the two businesses. The seller on his part may need money to put to other uses. The buyer and the seller may very well come to terms on a fundamental value for the company sold. Enterprise value may make sense in M&A transactions, not in the stock market.

Enterprise value is traditionally based on two complementary ways of looking at value. The first is an intrinsic method having to do with the way the cookie is likely to crumble (discounted cash flow method); the second is an analogical approach having to do with prices observed for comparable transactions (a method predicated on comparisons), which is self-explanatory.

The *discounted cash flow* (DCF) method revolves around analysis of a company's future cash flows; these are discounted so as to determine present-day value. Time is money and DCF takes into account the time going by (denominator) and the flow of random income depending on the weather to come (the numerator). It is by forecasting flows for the shareholder (and they change as the sky grows gray or blue) and by discounting them to bear in mind the cost of time and risk that we may fairly assess a value for the firm.

The method consists in estimating the value of the financial flows that will be generated by the firm and available for capital contributors

(shareholders and lending bankers) on the basis of the predictive business plan. The latter is a forecast for a given period of the future free cash flows that the company is likely to bring into being. The forecasting horizon, generally five years, may eventually be prolonged and it should; this is necessarily the case as regards new undertakings whose profitability is only long term. When one goes further, an end value (or residual value) has to be calculated. The weight of the latter in total value is inversely proportional to the number of projected years. Often the essential element in value has vitally to do with end value, calculated sometimes as the terminal point of a 10-year horizon. Under such conditions we see why the number of fundamental values may be equivalent to the existing number of fundamentalists! But it is not the case in M&A transactions where there are only two parties involved, the buyer and the seller.

Often the intangibles (which do not figure in the balance sheet and do not generate short-term profits) carry the greatest weight in fundamental value. Along with the brand name, know-how and skills, several new intangible elements appear: market standing, the business networks created by the company, its increasing returns with scale. How are these immaterial assets to be valued? When you apply the traditional DCF method, most of the value is to be found in end or residual value. In reality, value should be found in the options the company has taken – or kept open – for the sake of the future. Just think of the chess player who cannot predict all possible moves, but does know the weight of the options provided for him by a pawn, a rook, a bishop. The investor must be able to discern the competitive advantage that the company will be in a position to offer and maintain over the long haul.

The values of corporate finance

For the past 50 years much of the thinking on finance has been iconoclastic. Once upon a time, there existed a myth regarding the

existence of a hierarchy of financial sources in accordance with their respective costs. In Japan, for example, the idea that capital has a cost remains relatively new. The other myth pertained to indebtedness, which had to be avoided come what may. In 1958, Franco Modigliani and Merton Miller published a study entitled "The cost of capital, corporation finance, and the theory of investment".[10] They demonstrated that in an ideal capital market, the value of a firm would hinge exclusively on its activities and investment decisions, no matter how the latter were financed, that is the structuring of its permanent capital. Miller repeated an aphorism commonly imputed to the New York Yankees Hall of Fame catcher Yogi Berra. One day this great left-handed slugger was asked if he preferred his pizza to be sliced into four or to eight pieces. Given his state of hunger, he opted for eight. Miller added, "If you find that funny, you understand the Modigliani theorem." The number of portions does not modify the size of the pizza. The way in which liabilities are cut up does not alter the value of the company. The ratio between the level of debts and equity capital has no bearing on the latter. All it influences is the distribution of economic profit among creditors and shareholders.

Fundamentally, one does not create value by combining assets or by managing company liabilities. In that case, what is the use of financiers? A firm's value does not hinge on the way it finances itself, which means that one does not modify the cost of financing by tinkering with its structure. The weighted average cost of capital does not change just because sources of finance are restructured. An indebted enterprise is worth no less (nor more) than a debt-free one. If the cost of debt is lower than that of equity capital, one may think that the average diminishes when going into debt. This is merely an illusion: what the firm earns through indebtedness at a lower cost is lost as its equity capital grows more expensive. The more the company goes into debt, the greater its financial risks and the higher the rate of return required by the shareholder on its equity. The leverage effect of the debt increases shareholder benefits but also heightens their volatility, which means

that shareholder risk likewise grows. Normally one of the two effects compensates for the second; they cancel each other out. The mechanism does not alter the average cost of capital.

Unfortunately, this is only true in an ideal capital market. This is by no means a perfect world; in any event in the ideal there are no (death and) taxes. A later version of the Modigliani–Miller theorem took into due account the harsh realities of taxation. Dividends are distributions of benefits on which firms have paid corporation tax, while the interest paid is deductible from taxable profits. When raising its capital, the company undergoes a fiscal shortfall. When heightening its debt, the firm would seem to experience a windfall. In that sort of ball game, all its financing would be debt based.

That said, there exists a limit to be respected; it is that beyond which the level of indebtedness is such that the enterprise runs the risk of being unable to pay interest on its debt. It is this risk that is assessed by the rating agencies and explains why the most indebted or most poorly rated companies pay higher interest rates. The most profitable businesses, those that generate cash flow and display solid assets year in and year out, can afford more debts than others. The least profitable businesses – or those that operate in the most volatile industrial sectors – should, on the contrary, be saddled with less cumbersome debts. Among the latter are high-tech companies whose products may go out of fashion and heavy industry companies with production cycles such as steel and the automotive field. The industrial sector where the firm operates could justify a higher or lower degree of indebtedness.

However, let's take a closer look. If this were the case, companies would present virtually homogeneous risks: those operating in the most risk-strewn sectors would show scarcely greater overall risk on account of their non-indebtedness; those conducting less risky activities could heighten their global risk by going into deeper debt than others. But this is *not* the case. In reality, notwithstanding the elegance of Modigliani and Miller's reasoning, company behavior is closer to art than to finance. Businesses are averse to issuing new equity even if its marginal cost

barely differs from that of the existing equity capital. Why do they employ it only as a last resort?

In the 1960s, Gordon Donaldson explained that businesses finance their operations first by internal cash flow, then by indebtedness (short term if possible and then long term) and subsequently by issuing new stocks.[11] They first choose to finance their investments on retained earnings; in accordance with results, they finance their business plans by drawing on their treasuries; if at a later time they have recourse to outside financing, bank-based credit lines are par for the course. If that fails to suffice, they issue securities starting from the least risky and moving outwards; thereafter they will only increase capital outlay when push comes to shove. This is known as the "pecking order hypothesis".[12] A long-term historical perspective shows that such a theory is in a better position than modern finance to elucidate company behavior (even during the seventeenth century).[13] That much acknowledged, the theory remains somewhat blurred and fuzzy: it may explain how businesses tend to behave, but does not help us to understand why. More precisely, it provides no indication pertaining to the "correct" level of indebtedness. It doesn't help the captain to right his course. It is art, as I say.

New equity issues

New equity issues increase the potential of a company to finance its development other than by credit; the firm issues a number of new stocks against fresh money. In some countries (the UK and France, for example) when these securities are put on sale, existing shareholders are given top priority. In general they are provided with a subscription right proportional to the number of shares they hold before the operation. Quoted on the market, this right may be bought or sold so that the holder has enough shares to at least subscribe to a newly issued stock. In other countries (most notably the US), new equity is open to one and all.

Theory does not explain why one of these methods might be preferable to the other. The European method privileges existing shareholders. Even when the issue is performed at market price, shareholders nonetheless benefit from priority when subscribing to new shares. I would like to convince you that the European method unbalances the market for new equities. I start with the observation that equity issues often go hand in glove with a whiff of pessimism as regards the very short-term future of the issue. Why are new issues received with a pinch of salt? The new shares issued actually reduce per-share earnings. This dilution corresponds to the purely arithmetical decline in per-share earnings resulting from the higher number of shares. As a matter of fact, an announcement of a new equity issue puts an instant damper on prices. Yet in contrast, such an increase finances company growth and earnings potential; it thereby contains the dilution.

So how are we to explain the short-term tyranny? The reason has most likely to do with the incongruent horizons that distinguish professional investors from the principals of those whose money they endeavor to manage. Bank-based traders engage in a great deal of trading – not necessarily by executing the orders put forward by clients but as market makers or on behalf of their bank. They are not alone in this game. Trading consists in buying, selling or combining financial assets, which as a rule are liquid; this most often takes place within a few days, if not a couple of hours. At the end of the 1990s there coexisted tens of thousands of stock dabblers making a daily transaction or two via online services, and 4,000 or 5,000 day traders intent on short-term gain. More often than not, securities remained in the portfolios of the latter for just a few minutes. Traders act and react instinctively: they do not take the time to peruse a piece of information. The impact of financial operations on per-share earnings is immediately negative: it involves dilution; it will one day turn out to be positive if the funds involved allow for sustained growth, which will only ensue (if it does) later on. As already mentioned, the initial reaction to an announcement of a capital equity issue is negative; it consists, decidedly unfavorably, in lowered market

prices. In our homemade model of stock price adjustment, two ratios remain equal: on the one hand the buyer vs. seller percentage among operators; on the other hand the proportion of existing shareholders in relation to all market actors. The lower the percentage of optimists, the more non-shareholders have to intervene on the market. While the European method gives present shareholders a form of preferential treatment, it does not favor non-shareholders at a time when optimism has a tendency to fall. This is why the European method distorts the primary market.

Going public

The stock market is not, as we have learned, a game of Grab (first come, first served). It's a market, period. It's a primary market featuring numerous ways and means of financing. It's also a secondary market ensuring the liquidity of securities already placed in effective circulation.

The primary market is the one that organizes the issue of new instruments of capital and credit. Once associated with a specific instrument, this market has a "shelf life" that starts out with the decision to issue and winds up once the instrument is effectively invested. After that it is business as usual and a secondary market to trade the instrument for its remaining life. The main quandary proper to the primary market consists in successfully setting a price and placing the issue. For the placement, one generally constitutes a syndicate of banks. Known as the lead manager, the bank directing this syndicate takes charge, along with the issuing firm, of its composition. The lead manager plays a prime role in setting the issue price.

Two types of procedure allow for determination of the issue price: the first is a tender offer through which the price is predetermined; the second is putting up for auction, through which the price is set after a formal or informal bidding process. The former, widely practiced in Europe, is a fixed-price offer of a given quantity of securities; it may

provoke market imbalance if investor demand is inadequately measured. As for an auction, it is a mechanism allowing for price adjustment: supply is synchronized with demand. In a Dutch auction, the instruments are allotted to the highest bidders, in descending order, until the whole new issue is sold.[14] This type of sale is reserved rather specifically to fixed-income securities.

A flotation may commence with a sort of road show, a traveling presentation by company managers addressed to would-be investors. Following this road show, the syndicate gathers together indications of interest (IOI), which give an idea of the number of securities desired at various price levels. Banks are thereby enabled to draw up an order book registering possible investors' offers. They might require a *greenshoe*, which is the option of enlarging, to a certain extent, the size of the issue. The procedure may also feature a *clawback*, the option of channeling from one category of investors to another a precise percentage of the value of the titles put up for sale. Finally banks may grant a *naked short*, which is comparable to an airline company's overbooking. The number of securities put up for sale is greater than that actually offered. These securities have to be repurchased on the secondary market; such a factor helps to bolster market prices.

There is no denying the importance of the first steps taken when going public. A firm's flotation is the basic preliminary condition for the negotiation and quotation of a stock on the market. For shareholders it corresponds to patrimonial objectives. For a firm, it is often the way to growth. Projects such as launching new product lines or selling existing ones on a new foreign market may be financed by means of a new equity issue effected on the stock exchange. Stock quotation can also provide a solution following the founder's departure. It arouses the attention of financial intermediaries and the media as well; the information disseminated enhances the firm's image. The issue compels the firm to divulge its strategy to the public and to future shareholders. Thanks to market quotation and the allotment of stock options, a company may cause its staff members to be increasingly motivated, committed and

loyal. They may keep up with the prices on a day-to-day basis and draw benefit from their negotiability.

All of this looks good on paper. In practice, all hands are on deck to find a price for the newly listed stock and matters can become rather complicated. In Europe, flotation proceeds according to one of the following four methods: the fixed-price public offering, the minimal-priced offering, direct quotation and US-style book building.

Take the example of listings on Euronext (the European Stock Exchange). In a fixed-price offering, the firm indicates the number of shares put on the market and the proposed price. Any interested investor indicates to his bank the number of shares he wishes to purchase and for what price. Buy orders are transmitted by banks to Euronext and centralized. If the number of shares demanded exceeds the number of shares offered, Euronext will decide on a reduction rate in concert with the firm and the brokerage company responsible for issuing the security. The orders are executed in part, corresponding to the ratio between the number of shares offered and the number of shares demanded.

For the minimal-price offering, the company and the issuing bank indicate the number of shares offered to the market and the "floor" (or minimum) price. Orders are drawn up at a limited price for a predetermined number of shares. The investor must indicate when giving his order its amount and the price range in which he wishes to acquire the shares. Just prior to market introduction, Euronext centralizes all the orders, categorizes them by price and establishes a price range to sell the offering. The gap between the extremes must be at least 5 percent. Any and all orders within this range are executed at prices corresponding to the low end of the range (allocation to the lowest tenderer), but rates of execution may also significantly differ; the higher the price, the better the rate. The quoted price and the rate are subsequently made public.

Direct quotation (the standard procedure) is applied to shares that are already quoted. Last but by no means least, a "book-building"

procedure ensues. At the start of the investment an indication of price is disclosed; during the investment period it will be fine-tuned on the basis of orders actually received; and only after the closing of book building is the definitive price set. This method is patently the most helpful when it comes to assessing the degree of investor confidence.

Based on US methods that are more and more often employed throughout the world, book building allows banks in the investment syndicate to undertake a marketing campaign in order to test the sensitivity of demand to the issue price. Banks launching the product centralize the orders and, along with their customers, may be flexible when determining the opening price and the allocation of securities. On an overall basis this system allows them to gather in lucrative investment commissions (up to 7 percent of the offering). It has been used by some banks to favor their best customers at times when stocks are all but fought for. For example, in January 2002 CSFB, an investment bank, concluded an agreement with the US Securities and Exchange Commission costing it $100 million worth of indemnification. This bank was accused of having privileged its customers in the best IPOs during the market boom of the late 1990s. Such favors were claimed to be trade-offs for a "cut" of the stock gains achieved.

Takeover bids

In and of itself, the very fact of going public impels expansion and growth. It paves the way towards mergers and acquisitions. The company quoted disposes of a price for its shares which facilitates a takeover.

The *takeover bid* consists in publicly "stating the news" to the shareholders of a given company that you would like to acquire their securities at a predetermined price (generally higher than the quoted one). The takeover bid can be in cash or stocks.[15] Given current circumstances, tender offers either thrill the crowd or drive them to drink; what they do not do is leave anyone indifferent. They amply

entertain the general public: people read in the newspapers about the trials and tribulations of firms that quite unexpectedly hog the spotlight and it is like a life-size Monopoly board. The press has played a major role in the development of a form of mythology according to which raiders pounce on sleeping beauties attended and aided by black knights; the latter ensure financing of the operation by dint of junk bonds that utilize white knights in order either to bring into being shark repellents or else to force the raiders to swallow poison pill, not without providing as payoff a greenmail, while the managers bail out and leave town with a golden parachute. And some of this goes hand in glove with the white-collar crime known as insider trading; those in possession of confidential information cannot or will not keep a secret.

Takeover bids are especially frightening for the targeted companies: their very position is called into question. They also may traumatize the employees of the bought-out companies who refuse to be sold off along with the furniture. Of course they are often right; the transfer of a firm in the framework of a takeover bid may entail downsizing and layoffs. On the other hand, it appears rather obvious that when jobs have to be done away with, this is more readily effected in countries other than that of the headquarters. In this respect an acquisition by a foreign firm may turn out to be dangerous for employees far from the axis of power.

Taking as a given the preconceived idea that if it is not a place where everything is up for grabs, a stock exchange is at the very least an arena in which the only winners are those who do away with their competitors, the public is naturally and perhaps eternally tempted to draw a line between "good" and "bad" takeovers. In Europe many CEOs of listed companies try to convince their governments to prevent hostile takeovers. The good guys supposedly epitomize genuine economic logic and upgrade the efficacy of the means of production. As for the bad guys, they are allegedly obsessed by short-term profit. The heroes aim at ameliorating blameworthy management; the villains jeopardize the autonomy of prosperous companies. The good takeover

bids are said to be launched in full agreement with the targeted firm; the bad ones would be fought tooth and nail by its managers and they are routinely deemed hostile. Many bids start out hostile and end up friendly. This goes to show that there is no substantial difference between the two.

In fact, a takeover bid is nothing other than a procedure allowing someone, most often a company, to acquire control of a quoted firm. Control means a critical mass of shares crucial for management. As for the disappearance of the underdogs said to ensure survival of the fittest, it is far from an inevitable by-product of quotation. When two companies merge, it is because their shareholders are in agreement. Notwithstanding the pervasive mythology, a takeover bid is little more than an instrument facilitating the merger of one firm with another. And just like any other merger, it may turn out in the long run to be an ill-advised decision, but this does not call into question the decision-making procedure itself.

It is striking to note the efforts undertaken by many European countries to limit the risk of having their showcase companies filched; at the same time, they vocally complain when it turns out that the same companies cannot shop around in other European countries. It is with this in mind that Germany, in particular, has at times been castigated. And yet Deutschland AG, the German model in which the unions represented on the board systematically obstruct "hostile" takeovers, just may be turning over a new leaf. In 1999 the German takeover taboo was infringed when Vodafone made an offer for Mannesmann, the biggest bid ever launched in Germany by a foreign company. Then in 2001 Maria-Elizabeth Shaeffer (the Austrian widow of a German industrialist) generated a second shock wave when INA, the small-scale ball bearings manufacturer that she had inherited from her husband, pulled off a hostile takeover bid against a quoted competitor, FAG Kugelfischer. Juergen Geissenger, CEO of INA, had rung up by cellphone on a Friday afternoon his alter ego at Kugelfischer, Uwe Loos, to inform this person that his takeover bid would be launched the

following Monday morning! This was totally unheard of; indeed, the Vodafone/Mannesmann affair had been preceded by an attempt at amicable agreement. Even in Germany, the American way is making inroads.

9

The investors

In our times great fortunes constitute only a small proportion of the money invested on the financial markets. Historically speaking, financial investment was limited to rich landlords and then, following the celebrated explorations of the sixteenth century, to a few ship owners or trading bankers, the high net worth individuals of the epoch. Financial assets in largely agriculture-based economies were predominantly represented by land. The merchants utilized the markets for their goods and foreign exchange transactions; they could also score major coups or else suffer from them – remember the bubble of the tulip bulbs. It was the need for a mechanism to provide for future needs that opened up the market to a wider range of savings.

By the seventeenth century, the Netherlands and then England had started issuing life annuities, debt security that disappeared once the investor passed away. This financial breakthrough led the scholars of the time to take an interest in life expectation and thereby to enhance probability reckoning. Annuities constituted a convenient means of investing one's savings and ensuring oneself of income; at least this was the case to the extent that the sovereign continued paying the interest accrued on his debt! In the mid-seventeenth century an Italian named Lorenzo Tonti popularized an ancestor of life insurance (where subscribers share a common fund with the benefit of survivorship) known as a *tontine*. In the general framework of such contracts, a saver doles out funds to the state; the last man standing

(or the sole survivor) captures the jackpot. The annuity acquired by many is due to him or her alone. In England in 1774, the Gambling Act authorized and allowed for the regulation of life insurance. In France in 1787, Etienne Delessert founded the first life insurance company favoring savings as retirement funds for the lower and middle social classes. And in 1815, the celebrated Scottish widow, the emblematic "come-on" for the insurance mutual Scottish Widows, was brought into being (Lloyds TSB wound up buying it in 2000). This venerable institution was founded to provide aid and assistance for the prematurely widowed wives of the British soldiers killed in the course of the Napoleonic wars.

From the eighteenth century onwards, savings were touted as a prime factor in economic progress; they were even recommended for the working class. At the same time savings became more usable in economic growth because they left land and castles and arrived in trade and industry. That said, only baby steps were taken. Nineteenth-century men of private means generally tended to amass capital in property, as well as claims on the state to increase their annuities in a relatively risk-free manner. Only two centuries of progress permitted savers preparing for retirement to opt for stocks, to the detriment of fixed-rate investments with guaranteed capital, in unison with a trend that first took place in the US and then in England.

Today's stock market investors have markedly heterogeneous needs and expectations. Generally speaking, these investors are either wealthy individuals managing their savings on their own or professionals known as portfolio managers (or institutional investors) who administer funds on another party's behalf. Portfolio management constitutes an art in so far as instinct, intuition, decision-making prowess and downright courage may at one time or another be vital.

Individuals either manage on their own behalf or else delegate management of their investments to a specialist. The first way of dealing has been made easier with Internet-based market-related services that allow orders to be put through. The real problem with "live" stock

exchange transactions is that people generally do not have the backbone to sell on time. That is why it is advantageous to entrust their management to tried-and-true professionals. "Assisted management" effectively means that while the individual tends to his portfolio, he also receives fully informed professional advice. As for "delegated management", on the other hand, this means that the individual commissions an intermediary (registered portfolio management company, bank or investment firm) to handle his savings.

Individuals may also resort to an investment fund. At first delegated management was addressed to a well-heeled clientele. A comprehensive approach, in many ways drawn from US methods, has been devised for large-scale fortunes. This method is based on an apposite understanding of the investor's aims as well as systematized selection procedures. It is applied, in our day and age, to mutual investment funds. They manage capital for the public or for pension funds (in the countries where the latter exist).[1] There now exist funds whose profile should correspond to any given risk/return objectives.

Institutional investors are professionals in wealth management: they address themselves either to individuals whose fortunes they administer (they may also sell them investment funds) or to pension funds. Among them we find insurance companies that assume a managerial role, especially in Europe, where in some countries they replace pension funds. It bears mentioning that in northern European countries, pension funds are part and parcel of everyday life. In some Latin nations, one of which is France, they often come across as predatory and responsible for layoffs, as we shall see later. The French are inclined to forget that they play a worthwhile role in preparation for retirement not only in the US, but also in the UK, the Netherlands, Japan, Switzerland and in many other countries. These funds directly manage the sums of money with which they are entrusted, but they may also delegate their administration to investment funds. Institutional investors play a primary role as shareholders; their objective is to make the capital bear fruit.

High net worth individuals

Saver and small investor are terms that get a better press than capitalist and shareholder (especially when the latter is rich). Sports stars and singers are another story ...

The *World Wealth Report*, a study carried out every year by Merrill Lynch in conjunction with Cap Gemini, defines as a large fortune (or a high net worth individual, HNWI) any and all liquid financial assets of over $1 million. Financial assets are savings invested or capable of being invested on the financial markets, excluding real estate. All over the world, investment possibilities are more diversified for copious than for humdrum fortunes. HNWIs may invest in hedge funds and thereby diminish the risk of a hypothetical market crash on their portfolios. They may also invest in venture capital and private equity funds that are not open to mid-scale estates and have a chance of being tax free when offshore locations are brought to bear. With $30 million, you become a UHNWI (ultra high net worth individual). Once your assets total at least $50 million, you are in possession, as they say in Silicon Valley, of "f-you" money: you can tell the rest of the world to "go f--- off". With $100 million on hand or in stock, you're a mogul! Once you've reached the billion barrier, you're beyond words. According to *Forbes* magazine the world presently hosts 425 billionaires, 274 of whom are to be found in the US.

The *World Wealth Report* states that in 2000 the HNWI club had 7.2 million members (as opposed to 5.2 million in 1997, at the time of the first study of the subject). With their $27,000 billion, they are masters of one-third of the world's wealth. In 2000 the HNWI added only 180,000 new members, whereas there had been over a million extra the year before. Their fortune grew by 6 percent, whereas in 1999 it had increased by 18 percent. Economic trends dating from 2000 explain this slowdown. During that year the growth of many nations' economies and the strong performances of stock exchanges (up until the time of the Ides of March) had added 250,000 new members to the club over the course of the first

quarter; 8,000 of them were "millionaires by the minute" who lost this standing in the market crash that occurred at the end of 2000. According to the authors of this study, the worldwide number of large-scale fortunes grows by 8 percent a year and could reach nearly $40,000 billion by 2005.

One-third of the world's wealth is said to be located in the US, distributed among 2.5 million millionaires, a quarter in Europe (2.3 million), a fifth in Asia and an eighth in Latin America. Representing 11 percent of the total world population, Africa possesses just 2 percent of its wealth ($400 billion). At the bottom of the scale, the largest number of impoverished reside in Africa and the vast rural areas of India and China. In 1999 large fortunes in Asia increased by 22 percent; new fortunes had been built in India and China, most notably in computer-related fields. The following year, large Asian fortunes declined by 9 percent; this was basically due to the high percentage of Japanese wealth in the sum total and to economic and market difficulties encountered by that country at the beginning of the twenty-first century. On a worldwide basis, inequalities keep pace with poverty. The number of the poorest of the poor, those who try to get by on less than a dollar a day, grew steadily over 200 years until 1980.

Two World Bank economists, David Dollar and Art Kraay, came up with the following assessment.

> The world economy grew strongly between 1960 and 1980, but the number of the poor grew because growth did not occur in the places where the worst-off live. But since then, the most rapid growth has occurred in poor locations. Consequently the number of poor has declined by 200 million since 1980. Again, this trend is explained primarily by the rapid income growth in China and India, which together in 1980 accounted for about one-third of the world's population and more than 60 percent of the extreme poor.[2]

By the turn of the century the number of the extreme poor probably approached the figure of one billion (as opposed, at the time, to a mere

seven million HNWIs). The most deprived countries have not been benefiting from ongoing economic growth; either voluntarily or inadvertently, they have been left out of the business picture – voluntarily when their leaders are corrupt, inadvertently when the rich countries are protectionist. If in the well-heeled countries public opinion may be hostile to widespread opening of markets, it is because they fear the loss of their comforts and privileged status. During the 2002 meeting of the Davos Club (which was in New York that year), Horst Köhler, managing director of the IMF at that time, quite justifiably hoped that "the two giants, Europe and the United States, would not band together so as to preclude the opening of frontiers to third-world countries, most particularly as regards agriculture". Fat chance!

Historically speaking, amassed wealth was initially invested in lands and castles and then in gold and other precious objects; only later was it steered towards government debts and trade. In *The Wealth of Nations*, Adam Smith pinpointed the main causes of the eighteenth-century Industrial Revolution: the self-interest of large-scale landlords and merchants was vitally at stake:

> A revolution of the greatest importance to the public happiness was in this manner brought about by two different orders of people, who had not the least intention to serve the public. To gratify the most childish vanity was the sole motive of the great proprietors. The merchants and artificers, much less ridiculous, acted merely from a view to their own interest, and in pursuit of their own pedlar principle of turning a penny wherever a penny was to be got. Neither of them had either knowledge or foresight of that great revolution which the folly of one, and the industry of the other, was gradually bringing about.[3]

In today's poor countries, the enrichment of the "happy few" can't help but recall the childish vanity of the great proprietors excoriated by Smith. Early in the 2000s in Russia, the politico-financial imbroglio of Gazprom, a petroleum firm that represented close to 50 percent of overall

Russian financial wealth, provided a telling illustration. This fortune was built in haste; it was predicated on fraudulent misuse of public funds and could not have come into being without political backing.

Smith also insisted that the futility of the rich favored the speed of the wheel of fortune:

> In countries where a rich man can spend his fortune in no other way than by maintaining as many people as he can maintain, he is not apt to run out, and his benevolence it seems is seldom so violent as to attempt to maintain more than he can afford. But where he can spend the greatest revenue upon his own person, he frequently has no bounds to his expense, because he frequently has no bound to his vanity, or to his affection for his own person. In commercial countries, therefore, riches, in spite of the most violent regulations of law to prevent their dissipation, very seldom remain long in the same family.[4]

Andrew Carnegie, one of the American tycoons at the end of the nineteenth century,[5] shared Smith's hypothesis that inequality was the result of free enterprise and value creation. He wrote that "the problem of our age is the proper administration of wealth, so that the ties of brotherhood may still bind together".[6] He argued that the accumulation of riches should be invested in the interests of the highest number. And he felt that to further the spread of wealth, the state should tax inheritances "in condemnation of the selfish millionaire's unworthy life". Putting his philosophy into practice, Carnegie went on to found TIAA-CREF, a non-profit company, which was meant to assist retired professors. It was a pension fund before the term existed and it is one of the greatest success stories in the field of financial savings. Factors giving rise to inequality have much to do with mobility: people generally remain implanted in their territories and do not move. Goods, ideas and capital may circulate, but not people. Only the state (with its rules and institutions) is in a position to channel such deep-seated trends. Carnegie said it first; just doing it is another story.

Working within the boundaries laid down by the state's rules and institutions, wealth management hinges on the forms of investment selected. Whether they are loaned or invested, amassed savings are the fuel feeding the fire of economic growth, although not if they are kept in cash. Yet even today, and even in the developed nations, investment behavior greatly differs from one country to the next. More than anywhere else in the world, US households tend to have their savings invested in stocks. In 1980, according to the Investment Company Institute, only 6 percent of them had taken a stake in mutual funds. By 2000 over half had done so and 70 percent of the funds were invested in stocks. Following the events of September 11, 2001, US stock quickly returned to the level prior to the atrocities. One reason for this comeback resides in the statutory obligation inherent to most American mutual funds: they must remain 100 percent stock invested. Having sold some of their securities after the terrorist attacks, the mutual funds were compelled to buy them back.

The French generally conduct themselves in a diametrically opposed way. Their financial savings are predominantly hoarded in cash and in tax-exempt plans. Nine out of ten households possess financial assets (savings deposits, mortgages, securities and life insurance); that said, contracted savings with guaranteed returns remain preeminent: home savings plans, so-called "popular" savings along with life insurance. All of these investments go hand in glove with fiscal advantages. Eight out of ten households possess tax-free savings deposits; only 6 percent hold taxable ones. And when push comes to shove, the French are inclined to invest in life insurance. With €535 billion committed to the latter, France was (as of 1998) the premier European market. Life insurance is a substitute for pension funds in France and entails numerous fiscal advantages. The funds invested in life insurance are comprised of bonds (70 percent) and much less of stocks (13 percent).

In France, one household in eight is in direct possession of quoted stocks (12.4 percent, as opposed to 25 percent in the US). When these families opted for mutual funds, they quite often favored liquidity. As of September

2001, French funds were invested as follows: 11.7 percent French stocks, 15.8 percent foreign stocks, 9.5 percent French bonds, 2.9 percent foreign bonds and 42 percent money market funds. Households with average assets lay great stress on security. They may be willing to take a few risks with bonds, but when this has been done, that is that. It should be added that the French are somewhat allergic to stocks. According to a poll carried out in 1999 by *l'Expansion*, an economic magazine, 72 percent of the French are persuaded that stock investment is reserved for the happy few; 70 percent consider it high risk. In school textbooks the stock market is evoked only once, in connection with the Great Crash of 1929. It is by no means surprising that 37 percent of the French feel that the development of the stock market imperiled the economy. Yet where does wealth come into being, if not through the good offices of businesses? If you wish to channel it, you need to create your company and then sell it off, or else wind up holding shares in quoted firms.

How can you become a shareholder? Either you do it yourself or you get in touch with a broker. With the emergence of online brokers, this is no longer pie in the sky. Online brokers pass on sales or purchase orders at a cost infinitely less than that of a full-service broker. However, using them is easier said than done: one must sift through a slew of information, decide which stocks should be bought and also know the right time for their sale. In the US, often investors prefer taking the advice of a consultant working in a full-service investment firm. Even more often they have their savings managed by a broker.

In 2000 in Europe assets under management reached a total of €3,600 billion. Germany, France, Italy and the UK shared 58 percent of the assets. Just like the English, the French have their assets managed by an intermediary (this involves over 80 percent of their financial savings). Rather curiously, Italians prefer to invest themselves; they devote 22 percent of their investments to public debt securities and 11 percent to securities.[7]

How do professionals manage the savings with which they are entrusted? If all investors were identical, an investment manager would

be able to play monkey see, monkey do. But that is not the case: everything depends on the degree of risk that investors are ready to incur. At some times in their life they may be more risk averse than at others. If they expect to need funds in the near future, they will prefer relatively less risky – and less profitable – financial assets. Investors commit themselves for highly different periods of time. The shorter the investment horizon, the lower the appetite for risk. The investment horizon is consequently the main criterion when deciding on an allocation strategy. On a short-term basis, stocks constitute a risky investment. And yet in the long term bonds are probably riskier: they offer no protection against inflation. Historically speaking, stocks yield higher returns than bonds; they also offer better protection against inflation. And if you invest in the stocks of multinational companies, you are also sheltered from exchange rate oscillations. Last but not least, once you fully and finely diversify your portfolio, stock investment is not necessarily riskier than bond investment. What exact percentage of your portfolio should be invested in stocks? One of the inventors of the Capital Asset Pricing Model, Bill Sharpe, uses the "wet finger" rule: you must hold a ratio of stocks equal to 100 minus the age of the "skipper" – at the age of 60, 40 percent; at the age of 30, 70 percent. This is because stock-related risk diminishes along with the investment horizon.

Asset management advisers urge their customers to vary their financial investments in accordance with the horizon. And so, in a 15-year time frame, a 65-year-old retired person will generally be encouraged to allocate assets for the short term (the four years to come), the medium term (four to eight years) and the long term (over eight years). The first phase (zero to four years) is the hardest to manage. The saver cannot bank on high return for exceedingly volatile products (such as stocks); these are also the most heavily taxed in the short term. From one day to the next, liquidity may be remunerated through money market accounts; they keep up with the ongoing development of the money market. Liquidity is total: you run no risk of capital loss. The drawback consists in the fact that their returns are limited (less than 1

percent over inflation excluding tax). There do exist some more sensitive – and profitable – investments, for example treasury funds invested in short-term bonds.

When your horizon is four to five years, you may invest in bonds; specialists would nonetheless try to talk you out of it. This is because they are extremely difficult to manage; it also so happens that they are sought out by institutional investors. A given individual is like a tourist among a herd of elephants. Many other investment vehicles likewise roll. Income-distributing short-term bond funds are to be distinguished. They may well vary from one quarter to the next, and yet the objective remains the same: it is a matter of shielding the capital from bond market fluctuations. As for bond funds themselves, they entail some risks and are suitable for the middle term. If you wish to take on a trifle more risk, you may target the bond funds including corporate bonds, not to mention the high yield funds interested in firms' sub-investment grades.

If you have chosen supplementary revenue for a period longer than eight years, manifold solutions also function. In the long term risk is indeed amply remunerated, volatility goes down and taxation does not hit nearly so hard. Equity funds are another answer. They can be fine-tuned to the kind and degree of risk in accordance with predetermined risk profiles.

Equity funds

If investment styles of equity funds are just as numerous as the funds themselves, there exist two world-class philosophies of portfolio management: the first is active, and the second quantitative. It is a fight pitting art against science. While quantitative management delegates responsibility for investment to microprocessors, active management hinges on the flair and talent of a manager and a team.

Quantitative management consists in selecting financial securities through reference to a stock market index. There are two families of

quantitative management: the aim of the first is faithfully to reproduce the performances of this index; the second represents an attempt to obtain, over a medium or long-term horizon, results superior to that reference while keeping the risk of the index. What is the common area present in the two families? When judging their results, they make reference to a preliminarily identified objective measuring performances and possible risks. In order to construct and manage their portfolios, they make use of large-scale economic, financial and statistical data banks and models to select the types of assets, the countries as well as sectors and securities; all of these are "weighed into" their portfolios.[8] Launched in the mid-1970s following the success of Burton Malkiel's *A Random Walk Down Wall Street*, quantitative management has seduced some major players in the US: Vanguard and State Street are the best-known examples. By the end of 1999, about 30 percent of American pension funds had adopted this type of management. In the UK 28 percent of funds were quantitatively managed; this had begun rather belatedly, but went on to pick up exceptional speed.

Yet the new style of management has not altogether conquered either the sphere of institutional investors or that of college professors. None other than Malkiel, in the latest edition of his book (1999), recommended a nuanced, index-based approach reinforcing the role of "mid caps" in asset allocation. The upholders of active management believe that market penetration of passive management has reached a ceiling in the US and the UK.

Active management is a means of selecting financial assets founded on fundamental analysis. Through this method, the manager chooses the securities in which to invest; this choice is the outcome of a formalized decision-making procedure, but it remains an art. The word "portfolio" contains "folio" and the manager has to decide how much to spend on each leaf. The active management process is split into two steps so as to allocate the funds managed between asset classes first (strategic allocation) and then pick up the specific securities in each class (tactical allocation).

Strategic allocation consists in deciding on asset allotment in accordance with the horizon of investment and risk tolerated by the customer's profile. It is the risk limit imposed by the institutional customer, the risk style displayed by the fund or the management style in accordance with the investor's horizon that governs strategic allocation. Asset allocation remains subject to a certain number of constraints in view of minimizing risk; they hinge on the rules adopted by the funds. For example, there could be an obligation of sector-based diversification in relation to the composition and performance of the security price index. A fund may provide its managers with a limit of maximal deviation in relation to the stock index of 3 percent for each share and 5 percent for sectors. Tactical allocation adapts strategic choices to market realities. Let's take an example. If strategic allocation suggests to the manager that he should invest 60 percent of his portfolio in stocks, tactical allocation consists rather, for instance, in prioritizing the stocks of this or that country, but also in avoiding bank sector stock given the interest rate forecasts. As for fixed-income securities, tactical allocation leads to investing short rather than long, if a rate increase is anticipated.

Typically, management of an active fund follows the rhythm of two committees. The first, a monthly one, defines strategic allocation on the basis of analysis of the international macroeconomic environment and of interest rates, sectors of activity, countries and currencies. The second, a weekly one, indicates the tactical choices to be implemented. Portfolio construction sets store on more qualitative analysis dealing for instance with company notoriety, its potential for development as regards earning capacity, its competitive position, mastery of price policy and management quality.

Should active or quantitative management be favored? On the whole, the world of financial practice defends active management and the academic world quantitative management. The latter has in its favor the academic logic founded on a principle opposed to active management. According to this logic, only an investment's systematic risk is remunerated, to such an

extent that the manager must take more risk to heighten his return. According to academics, the latter is in fact not enhanced by the means of stock selection. Specific risk explains that some stocks can outperform others at certain times, but such success is not foreseeable; the very definition of specific risk renders it subject to chance. The principle of market efficiency in its semi-strong version leads to the same conclusions. On an efficient market, no investor can systematically beat the market. Numerous empirical studies have shown this to be generally the case.[9] Then again, active managers will tell you that the definition of the horizon falsifies the comparison. Annual returns do not correspond to a stock investment horizon, which is normally at least 10 years, and the greater the horizon, the fewer the data available. The active manager administering the most capital in Europe, Merrill Lynch Mercury, indicated in 1999 that it had beaten the FTSE index 11 times out of 18 (the investment horizon is three years in a 54-year overall period). This outperformance is respectable (on average 1 to 1.5 percent over the index), but are the observations (only 18 and with just a three-year horizon) statistically significant?

The arguments against index management influence the definition of the reference stock index. For example, when we refer to the SP 500 capitalization weighted or to the SP 500 equally weighted, 1998 performance was 26 percent for the first and 10 percent for the second. The indexes are not defined in the same manner: some are a simple average of prices (the Dow Jones Industrial Average); others a mean weighted by the market capitalization of the companies composing the index (Euronext). The very authority that defines the index is just a commercial entity among and in competition with others: Dow Jones (DJIA), Standard and Poor's (S&P 500), Russell (Russell 5000) in the US, Financial Times in the UK (FTSE 100), Morgan Stanley (MSCI) on an international scale. The rules for selecting the stocks composing the index are often opaque or defined by a scientific committee (in the best of cases). The composition of the Dow Jones, which belongs to the Dow Jones company, the owner of the *Wall Street Journal*, is decided by that

newspaper's editor-in-chief. The composition of the star index at the London Stock Exchange, the FTSE 100, was strongly modified in March 2000 in what appeared to be the biggest housecleaning ever performed since its creation in 1982. Since that change, "new economy" stocks (telecom, media and technology) have come to represent 40 percent of the FTSE 100. At the time these stocks were characterized by a high price/earnings ratio (p/e) and low dividend yield. The changed index composition meant instantaneous heightening of its p/e (from 21 to 23 times), while the dividend yield went down from 2.3 to 2.1 percent. But March 2000 represented the top of the technological bubble; the fall of prices over the following years must have made the FTSE regret its spring cleaning.

For an investor, the choice between active and quantitative management hinges on market developments. In a bullish market, beating the quantitative approach takes a lot of doing. In a seesaw market, active management will be preferred. In a bearish market, active management at times is more helpful than the indexes. But perhaps it would be preferable to hold fewer stocks. One cannot forecast market developments.

In active management there are two ways to choose stocks: top down and bottom up. With the former, the manager proceeds from the general to the particular. At first he analyzes the economic fundamentals of the main worldwide investment zones so as to decide on the proportion of the different markets in the portfolio. Then he decides on the stocks in accordance with their types: growth, value, cyclical, small cap, large cap.

Some securities benefit from sustained growth and high visibility on a buoyant market. The capitalization multiple is high. These are "growth" stocks. This type of stock had its day in the late 1990s when the TMT companies (technology, media and telecommunications) displayed spectacular rates of progress and shot up. "Value" are stocks that appear underrated in the stock market. These firms offer reduced visibility accompanied by mediocre results. Their price is low, but their value is

good, fundamentally sound; a strategic change, modification in management or an alliance may improve the future. As the market grows aware of the company's true value, its stock price mounts. That is what happened in 2001. "Cyclicals" are stocks of companies situated upstream in the productive sector; close to fixed investment and capital goods, they are subjected to turnarounds in the business cycle. "Small caps" are, according to the US terminology, stock market capitalizations lower than $750 million; large caps are higher than $3 billion.

Some funds prioritize a particular type of stock. In the US, for example, funds invested in value stocks for years outperformed those invested in growth stocks. Then the relative performances of the two types of securities were reversed: funds invested in growth stocks gave better results. Then again there was yet another reversal of the trend. Too bad that it is not possible at the outset of each period to foresee which category of securities and which style of fund will outperform the others!

With the bottom-up method, the manager takes the opposite tack: he selects the stocks company by company by comparing them with each other in their sectors of activity. This approach is also known as stock picking. The manager analyzes the attractiveness of the sectors to which the stocks belong in accordance with their situation in the economic cycle. The price/earning ratios may be equal, yet the security of a company does not present the same potential appreciation as its profits grow. Just imagine two companies that are valued on the stock exchange at 15 times the profits, but where the progression rate for results is 10 and 20 percent respectively; in that case it is preferable to invest in the latter. Here again, it is too bad that the growth in profits cannot be forecast with certainty.

Which is better, bottom up or top down? Some common-sense indications should prevail. In a recovering economy people will favor growth stocks over value stocks, because the price grows along with profits. In a depressed market people will prefer value stocks, one of whose merits is that they are not expensive. In a seesaw market bottom up and stock picking will be preferred.

Fund profiles

How do you choose the funds in which to invest, whether it be in quantitative or active management? According to the degree of risk they are ready to incur, investors have access to three fund profiles:

1. The prudent or defensive profile aims to preserve capital. Funds are preferably invested in bonds; this does not necessarily guarantee positive real returns, however.
2. The balanced profile allows for tempered management, with both protection of capital and a small amount of savings. These funds are invested in stocks and bonds, but their respective proportions differ greatly from one management establishment to the next.
3. Dynamic funds are reserved for those seeking long-term profits. Emphasis is laid on stocks, with more or less importance granted to diversification in foreign markets.

The notions of prudence, balance and dynamism are not defined by all managers in the same way. It is historical volatility that allows us to establish *ex post* differences between the funds. For Europerformance, a consulting firm, volatility for the prudent profile must not exceed 6 percent, it must range from 6 to 10.5 percent for the balanced profile, but it may exceed 10.5 percent for the dynamic funds.

So it is only after the fact that you can know whether you were right to adopt a quantitative or an active style, a dynamic rather than a defensive style, growth as opposed to value stocks. If the performance achieved is misleading, historical volatility is just as deceptive. As was noted by the great American economist Paul Samuelson, a historical sample is too limited to describe a form of volatility: it contains only one observation at each moment, which is what actually happened. Historical volatility may be the product of a genetic code, a sort of DNA of the risk inherent to each instrument. To understand risk, one must go beyond molecular analysis and decipher the "genetic tissue". It is from this tissue that historical volatility arises. To delimit risk you must deconstruct

it; this explains the approach consisting in apprehending risk in a qualitative way by analyzing the risk map. After that it is a matter of connecting the details and hoping that historical connections will happen again.

Another approach is more quantitative. It was developed by the consultancy firm APT[10] and consists in analyzing the covariance matrix of financial assets through application of the arbitrage pricing theory (APT) elaborated by Steve Ross in 1976. Sophisticated mathematical methods may make clear a small group of key factors, significant and non-correlated, that will serve to strip down the performance of each fund and then classify them, family by family. From observations of the weekly returns for all the securities traded on all the national, regional and worldwide markets over, for example, a three-and-a-half year period with over 10,000 securities for the US model, or 50,000 for the worldwide market, APT produces unbiased and highly accurate estimates of the covariance matrix. It connects all these details and reduces the matrix to about 20 principal components, but then these risk components must be analyzed in order to select the funds. This is when the qualitative takes over.

Following "stock picking", the era of "fund picking" has arrived. Premised on the idea that no manager can excel in all classes of assets, the fund of funds is a patchwork invested not directly in quoted securities, but in several among the 18,000 funds existing in the world. Multi-management consists in selecting funds and managers and making sure that the different components are mutually coherent. The world-wide leaders in multi-management are American (SEI and Franck Russell). With them you do not have to choose, but that merely puts the problem further down the road: how will they choose the winning funds? The selection processes are highly sophisticated. They are built on mathematical models that analyze how product performance develops. In the specialized press, funds are often classified in accordance with their annual performances. This is not particularly significant, yet they are taken quite seriously by the collective management industry, since

ranked funds attract more savings than others. Investors tend to invest in funds whose performance has been superior to others in the same category. Nevertheless, this works only provided that the funds that had obtained the best results over a past period of management also show the best results over the following period. This is by no means the case: the performances of one year cannot serve to predict those of the following year. Except for low-graded funds that are systematically found at the tail end of the ranking and stay there, past performance does not foretell future results. That said, fees and management costs do appear to explain the "underachievement" of some systematically low-graded funds.

Morningstar, which for over 15 years has been measuring the performances of funds in the US (and more recently in Europe), has popularized with its investors a simple idea: fund returns should be measured free of charge and be compared on a basis that takes risk into account. Performance analyses authorize the following two recommendations: investors should avoid funds that have recently experienced large net redemptions, and they should seek out those who register the lowest management costs.

If the degree of risk of the fund and its investment style (growth vs. value and large cap vs. small cap) affect the historical performance of the funds, the right degree of risk or the winning style is hard to foresee; it hinges on what the market in general will do. Can we find indications on the market trend? It always comes down to the question of knowing whether the market is too high or too low; this is measured by the mean price-earnings ratio. In theory, as we well know, the mean p/e for all stocks should be inversely proportional to the returns required by the market. The rate is generally measured as the rate of return for risk-free bonds, that is government bonds, increased by a risk premium. The bond rate must be inflation adjusted. If this rate diminishes, the p/e must increase. It must likewise increase if the risk premium diminishes. Finally, the p/e must also increase if one thinks that the growth of profits – and thus that of the economy – will increase. This explains the

interest for investors of analyses of the economic situation and the development of productivity. It also explains the interest of assessing the level of the risk premium.

The risk premium

Numerous studies have been conducted on the risk premium. They all have the same starting point: the shareholder measures the performance of an investment by comparing the sums he has invested in the company and the remuneration he draws, in the form of dividends and appreciation. He thereby deduces a return rate, which has got to be at least equal to what he would obtain in investments of the same nature presenting the same risk profile. The equity-risk premium measures the average annual additional profitability of stocks in comparison with a risk-free investment, for instance government bonds, as compensation for a stock investment, which is risky in principle. This premium may be calculated in two ways: either with the profitability that the investors aim to obtain, or with the historical premium that they have actually obtained. There is a basic difference between the two. This is the difference between receiving a reward for having agreed to take a risk, and foreseeing what compensation one may expect to receive for taking this risk. In fact, one has nothing to do with the other.

In a study published in 2002, London Business School professors Elroy Dimson, Paul Marsh and Mike Staunton calculated that over 100 years (1900–2000), this premium was historically 4.6 percent in 16 countries of the developed world.[11] Their book opens up the rather narrow US perspective of preceding works by collecting the stock market performances of 16 countries and extending it to a century of operations (Germany 6.6 percent; Australia 6.2 percent; Japan 6.1 percent; South Africa 5.2 percent; Sweden 5.1 percent; Italy 5 percent; USA 5 percent; France 4.9 percent; Netherlands 4.7 percent; Canada 4.5 percent; UK 4.2 percent; Ireland 3.2 percent; Belgium 2.8 percent; Switzerland 2.7 percent; Spain 2.2 percent; Denmark 2 percent). For the world summed

up in this manner, the average annual premium over 100 years would be 4.2 percent. In each of the 16 markets the real inflated-adjusted profitability of stocks exceeds that of bonds. The risk premium is positive everywhere: the optimists triumph.

Nevertheless, this triumph requires a nuance. The historical risk premium is indeed positive and this is altogether normal: firms' borrowings bring in a risk premium against government bonds. However, your investment must be maintained for quite a while for stocks to "beat" bonds; in some countries (the Netherlands, Germany, Sweden, Switzerland) it will have taken 40 years at some time in the century before it happened. Optimism does not tally well with the level of the historical risk premium, which is much higher than the theory indicates; academics felicitously term this paradox the "equity puzzle". The 4–6 percent level of risk premium translates exceptionally strong risk aversion on the part of investors.

How is this historical premium linked with that we may expect for the future? The expectation for the future measures the strength or weakness of investors' appetite for risk. It is used in corporate finance to calculate the cost of equity and thus of capital, which are useful in investment selection, evaluation and portfolio management. Its more or less elevated level may be an indicator of market under- or over-valuation. It is the variation of this risk premium combined with the development of real interest rates that may explain the development of the p/e over a long period.

One way of measuring the expected risk premium at a given moment is to determine the rate of return expected by the market. The expected return is calculated by equalizing the current price level of each stock to the present value of the dividends that the company should pay *ad infinitum*. This is a consensus-based calculation, as is that to which the methods of rational expectations have accustomed us. Forecast dividends emerge from the consensus of the research departments of banks.

A French consultancy, Associés en Finance, has been calculating this premium each month for over 10 years. As of late, they have also

calculated it on the scale of Euroland and estimated its level at 4.5 percent in January 2002. In France from 1987 to 2000 this premium varied from 1.5 to 6 percent. It fell to less than 2 percent before October 1987 (this exhibited the overvaluation of the market) and once again at the start of 2000. Dimson, Marsh and Staunton have estimated it as 5 percent for the entire world. At the beginning of 2002, the expected premium calculated by Ibbotson Associates (a US consulting firm) was 8.8 percent.[12]

It is difficult to understand how the risk premium can be 4.5 percent in Europe, 5 percent for the entire world but 8.8 percent in the US at the same epoch. It is easier if one notes that obviously once again the economists have confused arithmetical equality and causality. I mean that when one states that the p/e increases when the risk premium diminishes, we do not know whether it is the diminution of the risk premium that causes the increase in the p/e or the increase in the ratio that causes the diminution of the risk premium. What came first, the chicken or the egg? Associés en Finance's method demonstrates that it is indeed the latter. It is the level of prices that allows for determination of the level of the risk premium. Calculated in this way, the risk premium simply translates the development of stock prices and growth perspectives. It cannot be used to decide what the p/e should be for making an investment.

Another way of measuring the forward-looking risk premium consists in asking investors what it is. According to surveys in 2002, US investors expect a premium of 7.1 percent.[13] However, such expectations vary with recent market trends. It appears that just like economists, investors deduce the level of risk premium from the level of prices. It makes no sense under these conditions to insist on the amount of the risk premium when assessing the level of the market.

One has precious little hope of beating the market. As is often the case in the financial markets, the problem of the goose and the golden egg is to be found again. How could the funds claim to beat the market when *they* are the market? Market capitalization, that is the value of stocks

in the market, is the sum of the portfolios of all the investors. The performance of the market must therefore be the average performance of the portfolios. The measurement of performance is effected for a determined, generally annual period. This means that if there is a portfolio that does better than the market, there must necessarily be another that does not do as well. In contrast to what I said about stock market trade in which the buyer and the seller may both be winners (provided that their investment horizons differ), for two funds over one year there is a winner who does better than the market and a loser who does not do as well. Investors cannot all beat the market since market performance is the average performance of all the investors. This explains the interest of specialized investment vehicles different from traditional investment funds.

Hedge funds

A sum of $10,000 invested in George Soros's Quantum fund in 1969 would have been worth $26 million 30 years later. That meant a truly exceptional average progression of 30 percent a year.[14] And the Quantum fund is not unique. Between 1990 and March 2001, the average annual performance of a "basket" of hedge funds reached 11.6 percent, markedly superior to those of stocks and bonds, which were 7.89 percent and 6.96 percent respectively. Even if results are adjusted to take into account differences in volatility, over these 10 years hedge funds have registered a risk-adjusted performance superior to that of the traditional investment funds. The lack of reliable statistical data before 1988 nonetheless renders impossible a historical vision as far as that we have for the traditional funds.

The interest of having a sprinkle of these hedge funds (from 5 to 15 percent) in a portfolio is that they help optimize the risk–return ratio on account of their weak correlation with more classical products. Moreover, the strategies implemented by these investment vehicles are highly

varied; they develop independently of one another, thereby further heightening diversification.

Hedge funds are unregulated investment funds, allowing the investment managers substantially more freedom than regulated alternatives where the percentage of derivatives, leverage and cash may be restricted by law. Originally they were addressed to a limited number of qualified investors (the great family fortunes managed, for example, in the Bahamas) and institutional investors. In 2000 there were 6,000 of them, including nearly 400 in Europe, managing a total of $400 billion, of which 80 percent was for the account of HNWI and UHNWI.[15] Their profiles are extremely varied, but they all use derivative instruments and leverage; they utilize these to amplify residual returns or cover the risk of market declines. Typically, a hedge fund manager would want to provide the investments entrusted to him with a performance close to stocks with volatility close to bonds. The leverage effect of indebtedness may turn into a "sledgehammer" effect, but in only a few exceptional cases, such as that of LTCM. Hedge funds may resort to short sales, which is a blessing during downturns. More generally, their offshore location allows them to escape regulation; they may avoid all control of their activities by a supervisory organ. Moreover, they are addressed to customers who are supposed to be forewarned, which means wealthy, with at least $5 million for an individual and $25 million of managed assets for a professional.

With each financial crisis fingers are pointed at hedge funds, and they did not escape following the tragic events of September 11, 2001. Overly greedy, too numerous and excessively offshore, they were said to bear some responsibility in the fall of the market indexes. Yet the hedge fund industry provides a genuine alternative to traditional management. A study by Goldman Sachs identifies two important differences between hedge funds and traditional portfolio management.[16] For a hedge fund negative returns represent failure, whereas traditional management is defined in relation to a stock index: if the markets go down, the classical manager tries to do not as badly as the market.[17] The performance of a

hedge fund hinges upon its choice of financial instruments; that of a classical fund depends on the degree of risk borne.

Some of these funds take positions in currencies, stocks, bonds or commodities in accordance with their vision of the future. They make a bet on the future; in fact, they speculate. Other funds instead bet on the reduction of price spread in the financial markets, and yet they hedge (which explains the term "hedge fund"). In principle they take only a limited risk. Hedge funds follow highly varied strategies that read like a poem: market neutral, event driven, arbitrage, long/short, global macro and so on. The funds following a market-neutral strategy seek to profit from price disparities between neighboring types of assets, for example between straight, convertible and mortgage bonds. Some market-neutral funds operate on stocks but compose a portfolio whose beta is equal to zero. In principle these funds match long and short positions to profit from a change in their prices relative to each other.[18] They present the interest of being disconnected from the indexes; this diminishes portfolio volatility. Theoretically, they present little risk.

As for event-driven funds, they seek to profit from special situations, from an event affecting a security such as a merger, bankruptcy or takeover. They speculate on its future value following the foreseen event. This strategy is equally without direct correlation with the development of stock indexes and interest rates. Fixed-income arbitrage funds try to exploit price divergences in the fixed-income markets (both spot and derivative) by taking arbitrage positions in expectation of price realignment. They utilize the leverage effect to amplify these small differences.

Long/short strategies consist in combining long and short positions of stocks and bonds to reduce market exposure. This is the strategy that is most widely followed by hedge funds. To be implemented, equity long/short strategies require the use of short sales. Managers buy stocks that they expect to outperform the market and go short on stocks that they expect to underperform. As discussed earlier, to short a security, a manager will borrow it and sell it on the market at a price exceeding the

one at which he will repurchase it (hopefully) and return it to the lender. These funds are more exposed to market risk. Their managers often resort to fundamental analysis. They look for companies whose future growth is not reflected in the prices or for ones whose p/e does not reflect the quality. They go short on the most expensive stock and long on the least expensive one. Many concentrate on the small caps that are poorly followed by financial analysts. In 2001–2, a period of market crisis, long/short funds particularly suffered, which suggests that they did not make much use of their option to effect short sales and instead behaved like the traditional mutual funds. It also shows the poor performance of fundamental analysis. On the other hand, market-neutral funds demonstrated their efficacy in such a context.

Other types of funds follow tactical trading or global macro strategies. They use a top-down approach guided by macroeconomic analysis. Tactical trading funds profit from the short-term movements of commodities, currencies, stocks or bonds by basing themselves on technical (or chartist) analysis. They are the most active funds in the markets, where they can switch their positions in a few hours.

The short history of hedge funds has shown that on the markets one knows how to manage small risks, but not large ones. Large risks are those that have a small probability of happening but whose consequences are catastrophic, largely unforeseeable accidents that are difficult to analyze. I have already evoked the hedge fund LTCM and Enron, which in many ways functioned like a hedge fund without saying so. Yet these two stars of the industries underwent ordeals that nobody could have foretold. As another example, in spring 2000 Julian Robertson announced that he was closing his fund, Tiger Management, after having endured $16 billion of asset withdrawals over the preceding 18 months. Tiger had shown average annual growth of 26 percent between 1980, when he founded the group with $8 million, and 1999. At the time Tiger was the second largest hedge fund in the world following Soros Fund Management. Nevertheless, in 1999 and 2000 investors got cold feet. George Soros himself had to shorten sail to face

up to investor withdrawals, although these funds were supposed to present fewer risks in receding markets than classical funds. The lesson to be drawn is that the key to investment is not to attempt to beat the market but rather to diversify between several types of funds to control the risks.

Pension funds

Retirement pensions are financed by contribution or capitalization or both. Contrary to what is often claimed, all countries in the world, including the US and the UK, include in their retirement systems a contribution scheme ensured by the state, the first instance of which was in Bismarck's Germany. Active employees contribute to pay the pensions of the retired; the contributions for a given year finance the pensions paid that same year. As for France, which masquerades as *the* defender of the system of retirement by contribution, it is in fact a recent convert; only in 1945 was such a scheme implemented. It is older in the US, where the state has been paying for basic benefits financed by taxes and managed in contribution since 1933. Let me add that contribution schemes have passed all bounds, and that when there are no more boundaries, anything goes.

Retirement fund amounts know no limits; the retirement age has no "floor". This is a political question. In Europe the retirement age is going down, pensions are growing more sizable as life expectancy is increasing, contributions are going up and birth rates are going down. Thus the contribution system is hitting the wall. This explains the development of individual retirement savings. The main advantage of an individual system is its voluntary nature: individuals and families save and when they reach a specified age, they can recover a sum that they may spend as they wish, or else convert into an annuity. Retirement is not obligatory. One may choose the age at which one would like to retire, or else be semi-retired. In a contribution scheme, payment is akin to an income

tax. In a system of individual savings, retirement is not a tax but rather a saving.

Some countries have given preponderance to a system of retirement by capitalization, otherwise known as pension funds. A pension fund is a system of saving by paying supplementary revenue following retirement. It may be provisioned by the member or the employer. Acquired rights are managed according to the principle of capitalization; they are accumulated and the gains are reinvested up until the date of effective retirement in an account opened in the name of the beneficiary. In the US where this system is predominant, the majority of pension funds invest most of the savings with which they are entrusted in the capital of US firms. Calpers (California Public Employees' Retirement System), the pension fund for civil servants in California, is the most important fund of public origin in the US. In 2002 Calpers managed $150 billion of assets, nearly two-thirds of them in stocks (58 percent in quoted stocks, 5 percent in non-quoted stocks), the rest in bonds (27.8 percent) and in real estate (8.6 percent). Highly diversified, the fund had invested in more than 1,900 US firms (out of a total of 2,500 quoted companies). However, Calpers just devoted but 12 percent of its assets to foreign stocks (other US funds behaved similarly).

A quarter of all US households now own stocks because of development in pension plans. "Since 1990, total mutual funds assets have increased nearly sevenfold, and the assets of mutual funds that invest in stocks have grown even more, expanding nearly twentyfold. Over the same period, mutual fund assets have come to account for a larger share of household wealth. Moreover a greater proportion of US households now own stock, in large part because of their investment in mutual funds. Much of this growth has come in households' retirement assets, as developments in pension plans and other tax-preferred retirement accounts have increasingly made it possible for households to control more of their retirement asset portfolio – and households have tended to invest a significant portion of their retirement assets in mutual funds."[19]

Between 1990 and 2000, Americans have invested a significant portion of their retirement assets in mutual funds, because of the success of IRA (individual retirement accounts) and of employer-sponsored defined contribution plans such as 401(k). At year-end 2001, the assets accumulated by Americans for retirement exceeded $10 trillion, managed directly or by mutual funds, pension funds, insurance companies and banks.[20] Mutual funds retirement assets were 70% invested in equity funds as against 50% for all mutual funds.

In the UK, pension funds cover 75 percent of active employees. Up until the 1980s, supplementary retirement schemes were almost always managed by insurance companies; they guaranteed minimum returns (as is the case with life insurance in France). The companies guaranteeing the returns covered their risks by investing the premiums in a bond portfolio. The (at times) double-digit inflation of the 1970s convinced the British that if the right precautions were taken, stock investment better protected the savings accumulated for retirement than did bonds. It made better sense to invest directly in stocks and replace the insurance with diversification. So, by the mid-nineties, pension funds were invested in stocks to the tune of 73 percent in the UK and 57 percent in the US, but only 11 percent in Germany and 26 percent in Japan (1994 data).[21]

The lightning development of individual retirement savings may be partially explained by the coming of age of the baby boomers. The saving phase begins often when one is 40 to 50, let's say 45 years old. The baby boom lasted from 1946 until 1964. Therefore the first baby boomers probably began to save towards 1990. As for the category of those born in 1955, at the height of the baby boom, they started saving towards 2000 and will continue until 2015, the date at which they will begin to spend.

But what will happen from 2015 onwards, when these "peak-level" baby boomers retire? Stocks cannot be consumed. To whom will the future retirees sell them in order to live? In the OECD countries, active 20–65 year olds, who represented 60 percent of the population in 1995,

are likely to represent only 54 percent in 2040. In the emerging countries, these figures are respectively 51 percent and 58 percent. So the answer is clear: in 2010 the savers of the OECD countries will sell their financial assets to the savers of the emerging countries. They must thus be enriched, as Andrew Carnegie wished to happen at the end of the nineteenth century with the emerging classes of the United States.

In Europe and most particularly in France, it was claimed at the turn of the century that the US pension funds were responsible for layoffs. Bill Crist, the President of Calpers, declared to the French press:

> These allegations are totally erroneous; they are in no way justified by the facts. It is true that stock exchanges are places where speculators exchange stocks with other speculators without helping the economy. But it is equally true that the stock exchanges of all countries are places where long-term investors can come to buy stocks with the goal of keeping them for a long period. Pension funds held in trust serve long-term investment and not speculation; that is the reason why there should be more in the world ... These funds, of which some are quite large, are the best sources of "patient" capital that can be used for the growth of companies in the United States and in other countries, including the developing countries ... In fact, the greater the number of long-term "patient" investment funds helping to satisfy the demand for capital of firms that wish to grow, the greater the chance that in time, more jobs will be created.[22]

It is true that the obligation, at the end of a long period of payments, to return to their members a sum at least equal to the inflation-corrected sums paid leads pension funds to exercise an investment policy targeted toward shareholder value. Nevertheless, the French go a step too far; for them, the pension fund is the predatory shareholder *par excellence*. To heighten the profits of its principals, the fund manager will not hesitate to demand of directors that as soon as disappointing quarterly results lower the price of the stock, they

proceed to massive layoffs. The French press contended on several occasions that the return rates required by US pension funds, along with their short-termism, were the source of layoffs in large firms in France and other countries. A report by the Conseil d'Analyse Economique (CAE), a thinktank close to the Prime Minister, accused them of being factors of instability for French firms and propagators of crisis in the functioning of the world financial markets.[23] The Anglo-Saxon pension funds are accused in the CAE of the following:

- Taking excessive risks to pump up profits without the savers having entrusted them with their savings being aware of it.
- Using an erroneous criterion of management, the return on equity (ROE).
- Urging firms to go into debt and buy back their own stocks to show heightened ROE.
- Demanding excessively high long-term returns, driving companies to irrational behavior and particularly to massive layoffs.

The reason for this irrational behavior would be the competition involving funds. If he wishes to keep his customers, a manager must not allow himself to achieve a performance inferior to that of his colleagues, so he blindly plunges ahead. Another reason would be the systematic quest for value creation.

These accusations are completely wrong. I propose a new game of seven errors, those of the seven false ideas on pension funds.

First error. "The pension funds use an erroneous criterion of management: the ROE; they demand a return on equity of 15 percent." We have observed that while a firm can from time to time reach that percentage, this is certainly not the long-term case, still less for a whole sector. "Pension funds would be more interested in the short-term financial profit of companies than in the economic returns on the capital." The intimate behavior of pension funds is not easy to fathom; they do not publish their decision criteria in detail. But a rather

faithful image is provided by other financial actors who do publish their studies; just think of the financial analysts working for the market brokers who sell financial assets to the pension funds. Look at their financial analyses: economic indicators on companies are to be seen everywhere, but financial indicators of the ROE variety are few and far between.

In 1997 the US investment bank Merrill Lynch carried out a poll of 60 large international funds together representing $800 billion under management, 85 percent of which was invested in stocks. The purpose was to learn what kinds of information were useful to them in order to better orient Merrill Lynch's financial research. Indicators such as earnings per share and ROE were classified among those in which the financial analysts were the least interested. Large-scale investors instead strive to understand company strategy better. They wish not for consolidated but for divisional-based information; the latter is much closer to the company's growth and long-term development. This information must employ concepts near to entrepreneurial reality such as return on investment (ROI) or free cash flow. This is information that helps investors to appreciate the company's strategic strength.

Second error. "Pension funds take more risks than savers would wish." Pension funds, especially in the US, would impel companies to go into debt and, wishing to show stronger performances, would invest in stocks riskier than those desired by their principals. This would constitute a form of mass intoxication through which US savers would be hoodwinked by the pension fund managers.

It is a typically French eccentricity to think that few men of sound mind could discover, through the power of their analysis, a form of fraud perpetrated by nearly 3,000 fund companies managing $5,300 billion of assets to the detriment of 46 percent of US employees, who would suspect nothing.

Third error. "The dysfunctionality of the financial markets over the past two decades is due to the creation of value, which would thereby be the root of all evil." Indeed, pension funds impel companies to be more

efficient. That said, they cannot be taken to task for urging the optimal use of capital! Critics focus on indicators of value such as the EVA, which measures surplus profit, the portion of the profit that goes beyond the profitability that the investors had a right to expect (see Chapter 8). It is true that the EVA is not an indicator of market equilibrium. The authors of the report would be right were portfolio managers to concentrate their investments in the companies achieving the most excess profit. But this is not generally the case.

According to the critics of pension funds, the unbridled search for immediate excess profits and short-term "super" returns would induce companies to sacrifice the long term in favor of the short term. Not a single study has shown this to be the case in the US. Take research expenses as an example. On average and with the exception of Sweden,[24] American companies spend more on research (with GNP taken into account) than any other country in the world. Calpers keeps its stocks for 16 years. The turnover rate for pension fund portfolios is about one decade, whereas it averages two to three years for normal investment funds. This approach, which may be opposed to that based on high turnover, correlates the performance of funds with the creation of wealth or shareholder value that a company will operate over the long haul.

Fourth error. "Pension funds employ norms of profitability that are manifestly too high." The standard of profitability for the capital of US companies would pull upwards all the required returns. In other words, professional managers would have exaggerated demands for returns, demands that are not in line with economy growth perspectives or company reality.

The one way to know is to ask. In July 1999, Merrill Lynch carried out a poll of 66 western European managers in charge of a combined €1,735 billion, the objective of which was to discover how they valued the companies in which they invested. Their projection of long-term profitability for European stocks (the sum of the dividends received each year and capital gains, inflation excluded) was 7.6 percent and that was at the height of the boom. None of this is excessive, and in any case such

profitability is wholly compatible with the hypothesis of long-term growth.

Fifth error. "Risk premiums are disappearing." The pursuit of returns is fueling such a demand for risky assets that risk taking will no longer be remunerated. Higher prices will be explained by the disappearance of the risk premium. We have already dwelt on this. The market context of the time could explain the blindness of the study's authors. Yet had they seriously sought out market expectations and tried to find the returns required by investors, they would have found risk premiums of 3.5–4 percent in European countries[25]; this is in line with averages since the 1920s. The previously mentioned Merrill Lynch poll yielded a risk premium of 3.8 percent. This is only an average; the managers' answers range from 1 to 5 percent, a normal curve for a poll. Three managers did have excessive visions, but 3 out of 66 is a tiny minority. In any case the risk premium resurfaced in 2002!

Sixth error. "The prosperity of US retirees comes at the expense of employees." Pension funds came under attack in France during the Michelin affair in 1999. Commentators saw proof of the cynicism of a market system in which a firm (Michelin) could at once announce favorable six-monthly results and a large-scale three-year project of job elimination. It did so apparently under the pressure of Anglo-Saxon funds that couldn't care less about the industrial plans of the companies where they invested; their speculative vision was exclusively short term. The retirees of Wisconsin and the Scottish Widow upsized, while French firms downsized.

Yet US pension funds did not try to dictate strategy to company directors nor, *a fortiori*, interfere with their management. Nevertheless, US funds have the obligation to exercise rights to vote. In order fully to express their votes, funds apply general principles of sound management. They do not appreciate rights to double vote or defense measures against takeover bids. Let's take the example of Calpers again. In principle the fund never holds over 0.5 percent of a company's capital. It employs active management by applying the rules of corporate governance in merely a

dozen US companies among the worst run of its portfolio. These represent about 0.5 percent of the 1,900 companies where such funds are invested. The funds are seldom represented on the board of directors, but just like any investor they compare the development plans of the companies in which they invest. In the case of Michelin, analysts had obviously noted that with 97,000 employees, Goodyear registered the same sales figures as Michelin with its 127,000 employees.

Seventh error. "The stock exchange always goes bullish when layoffs are announced." This is far from invariably the case; analysis shows that the opposite is true. After all, stocks rise and fall along with economic cycles. Layoffs normally suggest a drop in growth and should consequently be negative for the market. A study published in the US in 1999 examined the reactions of the stock exchange to announcements of redundancies between 1970 and 1997.[26] The authors studied nearly 4,000 announcements of layoffs in over 1,000 large quoted companies. Most often, the US stock exchanges react negatively to such news. For the past 10 years, however, they have been reacting less negatively; following layoff announcements the market went down by 0.6 percent in the 1970s, by 0.2 percent in the 1980s and by 0.1 percent in the 1990s. Let's leave the last word to Bill Crist. In an interview with the weekly *Paris-Match* dated January 24, 2002, he declared:

> Pension funds are accused of "generating thousands of layoffs and of demanding a 15 percent return on investments", this is "absurd".

People claim so many absurdities about the financial markets!

There does exist a fundamental critique of investment behavior with which I fully associate myself. It has to do with the difference between investment horizon and market necessity. Investment strategies range from the long term in buy and hold strategies to the minute-by-minute round trip (scalping) of some types of hedge fund. The latter resemble day traders who don't keep stocks for more than a single exchange day. The philosophy of buy and hold consists in investing in stocks whose prices should rise in the long run along with growth in sales and

company profits. The long term is defined by investment horizons of over 10 years, such as those of the pension funds (again, 16 years for Calpers). This philosophy perfectly suits the needs of stock markets. Over this period, stocks will probably go through falls of 30 percent and advances of 40 percent. But in the end, it is likely that their gains will range from 6 to 10 percent per annum. This is simply because an estate is built over time. Today's crash matters little if the investment is long term; in 20, 15 or 10 years chances are that the markets will have risen again and the fund will wind up generating capital gains. Time does not respect what is done without it. The other advantage of the long-run strategy is its low cost: no round trip means no transaction costs.

Long-term portfolio management respects two principles: portfolio diversification (not putting all your eggs in one basket) to limit risks without multiplying costs, and the definition of asset allocation techniques, which consist in distributing the assets within a portfolio in accordance either with observed or foreseeable developments in a given sector or with quantitative analyses. In contrast, the speculative approach presupposes a short-term investment horizon, often a few days, at times a few months, seldom over two or three years. For investments of a few days, one may count on day traders or specialized hedge funds. Wagers are made on a limited number of financial assets; that's the best way to ensure optimal short-term returns, but also maximum risk. For one to two year periods, actively managed funds intervene. For up to two or three years, profiled management is applied. This approach leads to seeking out returns higher than those offered by the current market; the portfolio is tilted so that weight is imparted to financial assets that should outperform themselves. Even an asset allocation strategy reorients portfolios in accordance with predictions bearing on the worldwide economy.

With the exception of quantitatively managed funds, stock funds therefore have an intermediate horizon between hedge funds and pension funds. The turnover rate of their investments is a few years at most. And yet this investment horizon is too short when compared with the buy and hold strategy. Moreover, the mark to market accounting

procedure leads portfolio managers to practice "sight" management. Once your performance is measured from day to day as a function of the daily ups and downs of market prices, how can you manage on a long-term basis? Suppose that prices plummet by 15 percent in a month. It makes no difference in the calculation of your performance whether you have or haven't sold; you take your loss. So the manager is very tempted to reinvest his funds in other, more promising stocks.

It is thereby necessary to align the investment horizon of professional managers with that of their principals. If the latter wish to invest over the long term, then the management techniques applied by the former must also be long term. It is true that J.M. Keynes famously stated: "In the long run, we are all dead". But then again, Keynes was childless.

Notes

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Chapter 2

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Chapter 3

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5 ''Nowadays, people know the price of everything and the value of nothing.'' Oscar Wilde, *Lady Windermere's Fan*, 1892.
6 *The Economist*, November 22, 2001. See also Lowe, J., *Benjamin Graham on Value Investing*, Dearborn Financial Publishing, Inc., 1999.
7 Analysts at banks are supposed to address investment recommendations to customers; they are known as sell-side analysts. This term is apparently undeserved: according to the SEC, only 10 percent of these ''sell-siders'' actually recommend selling. As for the financial analysts who work with investment funds, they are known as buy-side analysts. They formulate investment advice for the businesses availing themselves of their services. Their analyses are not publicly disclosed, but one may surmise that they do not scream buy in 90 percent of cases.
8 That is to say p the percentage of optimists, o the percentage of pessimists, $p + o = 100\%$ of the investors. For prices to fall, the pessimistic shareholders (who represent 0.20 p% of the investors) have got to outnumber the optimists (who represent $(100 - p)\%$ of the investors). Equilibrium is produced when $p = 100/120$, that is to say when the percentage of pessimists $p = 83.33\%$ and $o = 16.66\%$.

9 *The Economist*, January 10, 2002.
10 Except for short sellers, but the seller who borrowed a stock may be seen as simply replacing a shareholder.
11 Malkiel, B. and Gragg, J., "Expectations and the valuation of shares, Working Paper n° 471, NBER, April 1980.
12 Malkiel, *op. cit.*
13 Bruce Russell, Head of Global Research, Barclays Private Banking.

Chapter 6

1 A derivative (or derivative product) is defined by the Derivatives Dictionary as "A financial contract whose value depends on a risk factor, such as the price of a bond, commodity, currency, share, etc.; a yield or rate of interest; an index of prices or yields; weather data, such as inches of rainfall or heating-degree-days; insurance data, such as claims paid for a disastrous earthquake or flood, etc." See www.margrave.com/Dictionary/DictionaryDF.tml#sectD.
2 Braudel, *La dynamique du capitalisme*, p. 39.
3 Treasury bills are short-term US government obligations, generally issued with 13-, 26- or 52-week maturities. Treasury bonds (or T-bonds) are long-term obligations of the US government that pay interest semi-annually until they mature or are called, at which time the principal and the final interest payment is paid to the investor. Treasury notes are the same as Treasury bonds except that they are medium term and not callable.
4 Jacobs, B., *Capital Ideas and Market Realities*, Blackwell, 1999, p. 27.
5 The daily cash flow system used by US futures exchanges to maintain a minimum level of margin equity for a given futures or option contract position by calculating the gain or loss in each contract position resulting from changes in the price of the futures or option contracts at the end of each trading day.
6 The use of borrowed funds or derivatives to increase exposure to an asset's price changes beyond the limits of one's capital.
7 Settlement is the act of fulfilling the delivery requirements of the futures contract.
8 Selling contracts when one anticipates an interest hike is not an error; we know, in fact, that higher rates entail lower prices for fixed-income financial securities, and that to protect ourselves from lower bond prices we should sell contracts, just like the oil refiner who protects himself against lowered gasoline or fuel prices by selling contracts.
9 Hadady, R. Earl, *Contrary Opinion: Using Sentiment to Profit in the Futures Markets*, Wiley, 2000.

10 Open interest is the number of non-unwound contracts kept by traders at the end of the session. This open position is composed of a long contract (buy) and a short contract (sell), which compensate for each other.
11 The background material pertaining to this analysis of the future market is primarily from Hadady, *op. cit.*
12 Hadady, *op. cit.*, p. 68
13 See Jacobs, *op. cit.*, p. 108.
14 Quoted by Jacobs, *op. cit.*
15 When citing this example, Jacobs makes reference to J. Liversidge, *Everyday Life in the Roman Empire*, G.P. Putnam's Sons, 1976.
16 Black, F. and Scholes, M.S., "The pricing of options and corporate liabilities", *Journal of Political Economy*, Vol. 81, 1973, pp. 37–54; Merton, R.C., "Theory of rational option pricing", *Bell Journal of Economics and Management Science*, Vol. 4, No. 1, Spring 1973, pp. 141–83.
17 Jacobs, *op. cit.*
18 Briys, E. and de Varenne, François, *The Fisherman and the Rhinoceros: How International Finance Shapes Everyday Life*, Wiley, 2000.
19 "Fishy math", *The Economist*, August 16, 2001.
20 Briys and de Varenne, *op. cit.*
21 When it was created in 1985 through the merger of Houston Natural Gas and InterNorth, the parent company of Northern Natural Gas, Enron's chief business was the operation of thousands of miles of natural gas pipeline.
22 Jacobs, *op. cit.*
23 Bruce I. Jacobs, "Options and market falls", *Pensions and Investment*, January 26, 1998.

Chapter 7

1 Taqqu, *op. cit.*
2 Diderot and d'Alembert, *op. cit.*
3 Baskin, J.B. and Miranti, P., Jr., *A History of Corporate Finance*, Cambridge University Press, 1997, p. 122.
4 Sensitivity is equal to maturity divided by $1 + i$, i being the rate of interest. For $i = 5$ percent, the sensitivity of a zero-coupon 30-year bond is thus equal to 28.6.
5 It would be close to 9.5 for a 1-to-10-year zero-coupon bond, if the interest rate were equal to 5 percent.
6 Siegel, *op. cit.*
7 I am reasoning for simplicity's sake in terms of arithmetical mean.

8 The Merrill Lynch model is explained in a publication by the bank, *Global Bond Market Economics*, dated October 1, 1999.
9 Michael Gibbons, quoted in ''l'Art de la Finance'', *Les Echos*, May 22, 1998.

Chapter 8

1 *Compagnie* (company) comes from the Latin *companio* designating the soldier who shares bread (*panem*) in his army group. According to Diderot and d'Alembert, *op. cit.*, in eighteenth-century France: ''The usage has nonetheless conserved the name of *compagnie*, for associations or special societies, when the members are numerous, the capital considerable.''
2 In its annual issue on the development of governance in large companies, Korn/Ferry's international office compares practices on each side of the Rhine and criticizes the German way: too many mandates for each administrator, overly nosy watchdog committees, overrepresentation of the banks. The German supervisory boards meet only about 5 times a year (the French average is 6.5), and foreigners represent little more than 6 percent of the administrators (21 percent in France). The modernization of ''Rhine'' capitalism appears to have fallen behind its French counterpart.
3 A September 2000 article in the *Financial Times* presents an elementary exposition of this thesis.
4 *The Economist*, January 25, 2001.
5 There remains a problem concerning employees whose insufficient training and skills mean that their permanent presence in the firm cannot constitute, for the latter, a form of capital. Every now and then they supply what Karl Marx termed, in the nineteenth century, a ''merchandise'' labor just barely allowing them, when they benefit from a job, to subsist. All economists, whatever their leanings, agree that a major challenge for modern societies will indeed consist in putting all potential employees in a position to provide companies with human capital rather than undifferentiated, merchandise-like labor.
6 Rappaport, A. and Mauboussin, M.J., *Expectations Investing: Reading Stock Prices for Better Returns*, Harvard Business School Press, 2001.
7 The 1929 crash occurred during the year when dividend yield had all but fallen to the bond interest rate. Prior to 1958, the dividend yield invariably exceeded the interest rate. Since 1958, the latter has just as consistently exceeded the former.
8 ''Marked by the market'', *The Economist*, November 29, 2001.
9 In approximately 430 BC, the Greek philosopher Zeno of Elea expressed paradoxes such as ''Achilles does not catch up with the tortoise'', a paradox

putting forward the question of the divisibility of space and movement and still contributing to the work of the twentieth-century logicians.

10 Modigliani, F. and Miller, M., "The cost of capital, corporation finance, and the theory of investment", *American Economic Review*, June 1958.

11 G. Donaldson, *Corporate Debt Capacity*, Harvard University Press, 1961.

12 Myers, S., "Capital structure puzzle", *Journal of Finance*, July 1984.

13 Baskin and Miranti, *op. cit.*

14 That is how tulip bulbs were sold, most famously in Holland, from 1634 to 1637.

15 The first takeover bid dates from 1902; it was in that year that John Pierpont Morgan acquired Carnegie Steel for $1.5 billion (the equivalent of $20 billion 100 years later). For comparison's sake, Total Fina acquired Elf in 1999 for $54 billion, not even three times more, and this was the greatest takeover ever effected in France!

Chapter 9

1 Mutual funds are a portfolio of various stocks managed by a person or a computer according to rules that the originator of the fund focused on. These rules vary extensively from one fund to the next. They can be found in the fund's prospectus, or informational packets.

2 Dollar, D. and Kraay, A., "Spreading the wealth", *Foreign Affairs*, Jan/Feb 2002, p. 125.

3 Smith, A., *The Wealth of Nations*, Edwin Cannan (ed.), Methuen, 1904 (first published 1776), Book 3, Chapter 1, p. 440.

4 *Ibid.*, p. 440.

5 Andrew Carnegie (1835–1919) was one of the "robber barons" – if not the only one – who made positive contributions to the development of society. Like other tycoons of the time, he was a self-made man; he wanted to make big money (which he made in the steel industry), but in contrast to the rest of the buccaneering business entrepreneurs he had a real passion for the things of the spirit. See E. Hobsbawm, *The Age of Capital: 1848–1875*, Vintage, 1996, pp. 145 and 246.

6 "The new wealth of nations", *The Economist*, June 14, 2001.

7 *Observatoire de l'épargne européenne, comportement financier des ménages en Europe 1995–1999.*

8 Presentation of State Street on the web. State Street is among the world leaders in quantitative portfolio management.

9 There are nonetheless a few notable exceptions. Warren Buffet, the sage of Omaha, has beaten the market with a vengeance, and he has been doing it for over 30 years. But statisticians explain that such a performance does not contradict the general principle. Even in roulette, some numbers can experience winning streaks. More seriously, the authorities on the subject have shown that efficiency has limits; investment in ''mid-caps'', for example, presents returns greater than would be justified by the risk taken.
10 APT develops, produces and distributes leading-edge market-risk models and software-based tools.
11 Dimson, E., Marsh, P. and Staunton, M., *Triumph of the Optimists*, Princeton University Press, 2002.
12 ''Stock market valuations'', *The Economist, February 2, 2002.*
13 *Ibid.*
14 Soros's flagship fund, the Quantum fund, had an average annual return of over 30 percent for the 30.5 years (1969–June 2000) of its existence.
15 Merrill Lynch/Cap Gemini Ernst and Young, *World Wealth Report*, 2001.
16 Goldman Sachs and FRM, *Hedge Funds Demystified*, July 1998.
17 During the last 12.25 years of the twentieth century, the S&P 500 index had eight negative quarters, totaling a negative return of 33.8 percent. During those negative quarters, the average US equity mutual fund had a cumulative negative return of 37.2 percent, while the average hedge fund had a cumulative negative return of only 0.70 percent, thereby displaying the ability of hedge funds to preserve capital in falling equity markets (source: Fraternity Fund Management Ltd., 2001).
18 When long and short positions are matched, the market-neutral strategy should render the portfolio insensitive to market risk.
19 Engen, E.M. and Lehnert, A., ''Mutual funds and the US equity market'', *Federal Reserve Bulletin*, December 2000.
20 Investment Company Institute, *Mutual Funds Fact Book*, 2002.
21 Lorenzi, J.H., *Retraites et épargne*, Conseil d'Analyse Economique, 1999, p. 213.
22 W. D. Crist, ''Les fonds de pension ne sont pas l'ennemi de l'emploi'', *Les Echos*, January 15, 2002.
23 Conseil d'Analyse Economique, *Architecture Financière internationale*, 1999, pp. 550–96.
24 OECD, quoted in Lorenzi, *op. cit.*, p. 212.
25 Bancel, F. and Ceddaha, F., ''Vers une prime de risque unique'', *Analyse Financière*, June 1999.
26 Farber, H.S. and Hallock, K.F., ''Have employment reductions become good news for shareholders? The effect of job loss announcements on stock prices, 1970–1997'', National Bureau of Economic Research, working paper no. 7295, August 1999.

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