1 Purpose and Structure of Financial Markets

1.1 OVERVIEW OF FINANCIAL MARKETS

Financial markets play a major role in allocating excess savings to businesses in the economy. This desirable process takes various forms. Commercial banks take depositors' money and lend it to manufacturers, service firms, or home buyers who finance new construction or improvements. Investment banks bring to market equity and debt offerings of newly formed or expanding corporations. Governments issue short- and long-term bonds to finance the construction of new roads, schools, and transportation networks. Investors (bank depositors and securities buyers) supply their funds in order to shift their consumption into the future by earning interest, dividends, and capital gains.

The process of transferring savings into investment involves various participants: individuals, pension and mutual funds, banks, governments, insurance companies, industrial corporations, stock exchanges, over-the-counter (OTC) dealer networks, and others. All these agents can, at different times, serve as demanders and suppliers of funds, or as intermediaries. Economic theorists ponder the optimal design of securities and institutions, where "optimal" implies the best outcomes – lowest cost, least disputes, fastest – for security issuers and investors, as well as for the society as a whole. Are stocks, bonds, or mortgage-backed securities, the outcomes of optimal design or happenstance? Do we need "greedy" investment bankers, securities dealers, or brokers? What role do financial exchanges play in today's economy? Why do developing nations strive to establish stock exchanges even though they often have no stocks to trade on them? Once we answer these basic questions, it will not be difficult to see why all the financial markets are organically the same. In product markets, the four-cycle radiator-cooled engine-powered car and the RAM memory-bus-hard disk personal computer have withstood the test of time. And so has the spot–futures–options, primary–secondary, risk transfer-driven design of the financial market. In the wake of the 2008 crisis we have seen very limited tweaks to the design, because it is so robust.

All markets have two separate segments: *original issue* and *resale*. These are characterized by different buyers, sellers, and different intermediaries, and they perform different timing functions. The first transfers capital from the suppliers of funds (investors) to the demanders of capital (businesses); the second transfers capital from the suppliers of capital (investors) to other suppliers of capital (investors). The two segments are:

- *Primary markets* (issuer-to-investor transactions with investment banks as intermediaries in the securities markets, and banks, insurance companies and others in the loan markets);
- *Secondary markets* (investor-to-investor transactions with broker-dealers and exchanges as intermediaries in the securities markets, and mostly banks in the loan markets).

All markets have the originators, or issuers, of the claims traded in them (the original demanders of funds) and two distinctive groups of agents operating as investors, or suppliers

of funds. The two groups of funds suppliers have completely divergent motives. The first group aims to eliminate the undesirable risks of the traded assets and earn money on repackaging, the other actively seeks to take on those risks in exchange for uncertain compensation. The two groups are:

- *Hedgers* (dealers who aim to offset primary risks, be left with short-term or secondary risks, and earn spread from dealing);
- *Speculators* (investors who hold positions for longer periods without simultaneously holding positions which offset primary risks).

The claims traded in all financial markets can be delivered in three ways. The first is an immediate exchange of an asset for cash. The second is an agreement on the price to be paid with the exchange taking place at a predetermined time in the future. The last is a delivery in the future, contingent upon an outcome of a financial event, e.g. level of stock price or interest rate, with a fee paid up front for the right of delivery. The three market segments based on the delivery type are:

- *Spot* or *cash markets* (immediate delivery)
- *Forward markets* (mandatory future delivery or settlement)
- *Options markets* (contingent future delivery or settlement)

We focus on these structural distinctions to bring out the fact that all markets not only transfer funds from suppliers to users, but they also transfer risk from users to suppliers. They allow *risk transfer* or *risk sharing* between investors. The majority of the trading activity in today's market is motivated by risk transfer with the acquirer of risk receiving some form of certain or contingent compensation. The relative price of risk in the market is governed by a web of relatively simple arbitrage relationships that link all the markets. These allow market participants to assess instantaneously the relative attractiveness of various investments within each market segment or across all of them. Understanding these relationships is mandatory for anyone trying to make sense of the vast and complex web of today's markets.

1.2 RISK SHARING

All financial contracts, whether in the form of securities or not, can be viewed as bundles, or packages of unit payoff claims (mini-contracts), each for a specific date in the future and a specific set of outcomes. In financial economics, these are called *state-contingent claims*.

Let us start with the simplest illustration: an insurance contract. A 1-year life insurance policy promising to pay $1,000,000 in the event of the insured's death can be viewed as a package of 12 monthly claims (lottery tickets), each paying $1,000,000 if the holder dies during that month. The value of the policy up front (the premium) is equal to the sum of the values of all the individual tickets. As the holder of the policy goes through the year, he can discard tickets that did not pay off, and the value of the policy to him diminishes until it reaches zero at the end of the coverage period.

Let us apply the concept of state-contingent claims to known securities. Suppose you buy one share of XYZ SA stock currently trading at €45 per share and pays no dividends. You intend to hold the share for 2 years. To simplify things, we assume that the stock trades once a month and in increments of €1. The minimum price is €0 (a limited liability company cannot have a negative value) and the maximum price is €199. The share of XYZ SA can be viewed as a package of claims. Each claim represents a contingent cash flow from selling the share

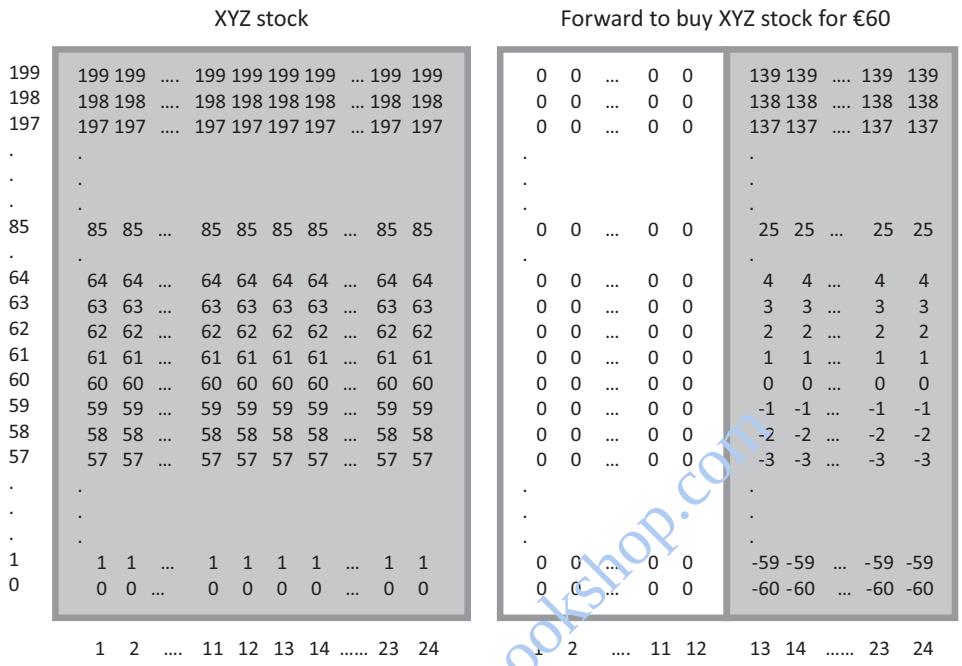

Figure 1.1 Stock and forward as packages of state contingent claims

for a particular price in a particular month in the future. Only one of those claims will ever pay, say when we sell the stock for €78 in month 16. We can arrange the potential price levels from €0 to €199 in increments of €1 to have overall 200 possible price levels. We arrange the dates from today to 24 months from today (our holding horizon). The stock is equivalent to 200 times 24, or 480 claims. The easiest way to imagine this set of claims is as a rectangle with time on the horizontal axis and potential stock prices (states of nature) on the vertical axis. The *price* of the stock today is equal to the sum of the *values* of all the claims, i.e. all the state- and time-indexed squares of the rectangle.

Figure 1.1 shows the stock as a rectangle of 480 state-contingent claims. It also shows a forward contract on XYZ SA's stock viewed as a subset of this rectangle. Suppose we enter into a contract today to purchase the stock 13 months from today for €60. The forward can be viewed as a 200-by-24 rectangle with the first 12 months' worth of claims taken out (equal to zero, as no action can be taken). If, in month 13, the stock trades above €60, we have a gain; if the stock trades below €60, we have a loss equal to the difference between the actual stock price and the precontracted forward price.

Figure 1.2 shows a long American call option contract to buy XYZ SA's shares for €60 with an expiry 2 years from today as a 139 × 24 subset of our original rectangle, the rest zeroed out. The squares corresponding to the stock prices of €60 or below are eliminated, because they have no value. The payoff of each claim is equal to the intrinsic (exercise) value of the call. Figure 1.2 also shows a short American put struck at €60 with an expiry in 12 months.

The fundamental tenet of the option valuation methodology which applies to all securities is that if we can value each claim (one square of the rectangle) or small sets of claims (sections of the rectangle) in the package, then we can value the package as a whole sum of its parts.

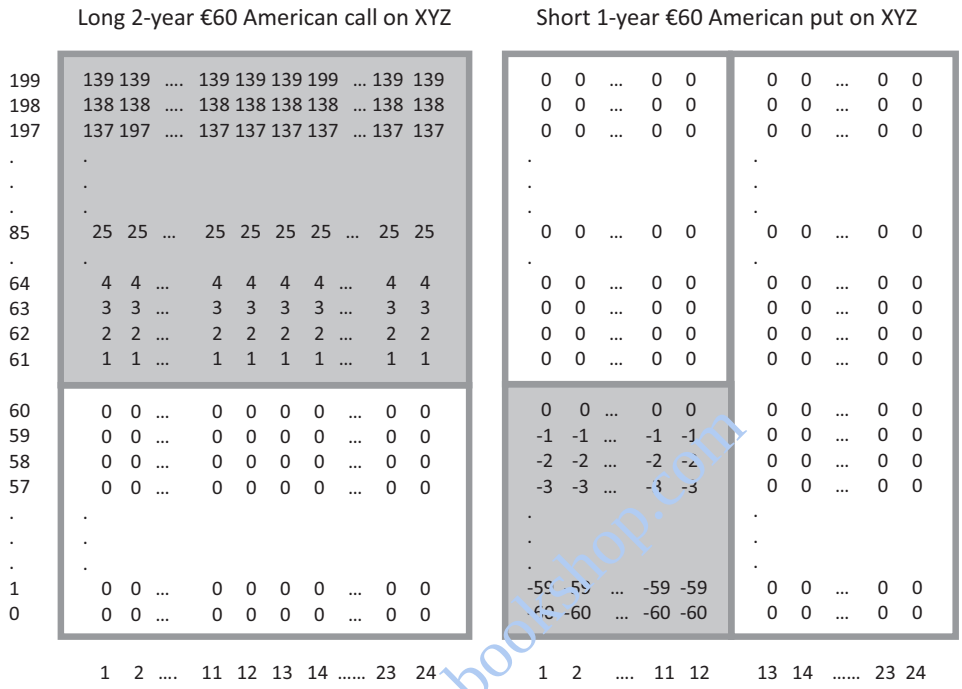

Figure 1.2 Long American call and short American put as packages of state-contingent claims.**aims**

Conversely, if we can value the package, then we are able to value subsets of claims through a subtraction of the whole minus a complement subset. Also, we may be able to combine disparate (dependent on different state variables) sets of claims (stocks on equity prices and bonds on interest rates) to form complex securities (a convertible bond). By subtracting one part (option) from the value of the combination (convertible bond), we can infer the value of a subset (straight bullet bond).

In general, the value of a contingent claim does not stay constant over time. If the holder of the life insurance becomes sick during the year and the likelihood of his death increases, then the value of all claims increases. In our stock example, the prices of the claims change as information about the company's earnings reaches the market. Not all the claims in the package have to change in value by the same amount, however. An improvement in the earnings may be only short term. The policyholder's likelihood of death may increase for the days immediately following his illness, but be less for more distant dates. As the prices of the individual claims fluctuate over time, so does the value of the entire bundle. However, at any given moment of time, the sum of the values of the claims must be equal to the value of the package, the insurance policy, or the stock. The valuation effort is restricted to here and now, and we have to repeat the exercise an instant later.

A good valuation model strives to make the claims in a package independent of each other. In our example, the payoff of the life insurance policy depends on the person *dying* during the month, not on whether the person is dead or alive. In that set-up, at most one claim of the whole set will pay. If we modeled the payoff to depend on being dead and not dying, all the claims after the morbid event would have positive prices and be contingent on each

other. Sometimes, even with the best of efforts, it may be impossible to model the claims in a package as independent. If a payoff at a later date depends on whether the stock reached some level at an earlier date, the later claim's value depends on the prior one. A mortgage bond's payoff at a later date depends on whether the mortgage has not already prepaid. This is referred to as a *survival* or *path-dependence* problem. As our imaginary two-dimensional rectangles cannot handle path dependence; we ignore this dimension of risk throughout the book as it adds very little to our discussion and can usually be handled by models.

Let us turn to the definition of risk sharing.

Definition *Risk sharing is a purchase or a sale, explicit or through a side contract, of all or some of the state-contingent claims in the package to another party.*

In real life, risk sharing takes many forms. The owner of the XYZ share may decide to sell a covered call on the stock (see Chapter 5). If he sells a 2-year American call struck at €60, and gives the buyer the right to purchase the share at €60 from him even if XYZ trades higher in the market, the covered call seller is capping his stock-cum-option payoff at €60 in exchange for an up-front option premium that he receives. This corresponds to exchanging the squares corresponding to price levels above €60 for squares with a flat payoff of €60, or to subtracting, one-by-one, the payoffs in the American call package in Figure 1.2 from all the state-contingent claim payoffs in the stock package in Figure 1.1. This illustrates the important risk-sharing role of options in financial markets. Stockholders can buy or sell off parts of their holdings, and others can acquire subsets of the entire stock risk.

Another example of risk sharing is the *hedge* of a corporate bond with a risk-free government bond. A *hedge* is a sale of a package of state-contingent claims against a primary position, which eliminates all the risk of that position coming from one state variable. The sale of a security that is identical to the primary position is the only transaction that can eliminate all the risk. A *hedge* always leaves some risk *unhedged*! When a trader purchases a 10-year 5% coupon bond issued by XYZ Corp. and, in an effort to eliminate interest rate risk he simultaneously shorts a 10-year 4.5% coupon government bond – duration-matching the size of the short – he guarantees that for small parallel movements in the interest rates, the changes in the values of the two bonds are identical, but opposite in sign. If interest rates rise, the loss on the corporate bond holding will be offset by the gain on the short government bond. If interest rates decline, the gain on the corporate bond will be offset by the loss on the government bond. However, as explained in Chapters 2 and 7, the second state variable credit spread is completely unhedged. In fact, the trader speculates that the credit spread on the corporate bond declines. Irrespective of whether interest rates rise or fall, the trader gains if ever the XYZ credit spread declines since the corporate bond's price will go up more, or go down less, than that of the government bond. It is only when the credit standing of XYZ worsens and the spread rises, that the trader will suffer a loss. The corporate bond is exposed over time to two dimensions of risk: interest rates and corporate spread. In the state-contingent claim sense, the corporate bond would be represented by a large rectangular cube with time, interest rate, and credit spread as dimensions. The government bond hedge eliminates all potential payoffs along the interest rate axis, reducing the cube to a plane, with only time and credit spread as dimensions.

Almost any hedge or relative value arbitrage position discussed in this book can be thought of in the context of a multidimensional cube defined by time and risk state-variable axes. The hedge eliminates a dimension or a subspace from the cube.

1.3 TRANSACTIONAL STRUCTURE OF FINANCIAL MARKETS

Most people think of financial markets as a giant bazaar with individuals buying and selling stuff to each other for money. The "stuff" they trade is paper claims on future earnings, coupon interest, or insurance payouts. If you buy good claims and their value goes up, you can sell them for more; if you buy bad ones and their value goes down, you lose money.

Finance and economics professionals usually offer a seemingly more complete description of this process, adding detail about who buys and sells what and why in each market. They may educate us that businesses and governments need funds. They issue stock, lease- and asset-backed bonds, unsecured debentures, sell short-term commercial paper, or rely on bank loans. These issuers get their required capital and, in exchange, promise to pay interest payments or dividends in the future. The legal claims on business assets are purchased by investors, both individual and institutional, who spend cash today to get more cash tomorrow, i.e. they *invest*. Investors can leverage themselves by borrowing cash to buy more securities, and through that they themselves become issuers or users of broker margin or bank loans.

While this bazaar description of the financial transactions appears to be very comprehensive, it is actually an incomplete one-dimensional portrait of a multidimensional object. The missing dimension is the *time of delivery*.

The standard view focuses exclusively on spot markets where investors purchase securities and pay for them at the time of the purchase. To manage risk they diversify or hedge by holding shorts against longs. Most are investors (*read*: speculators) hoping to buy low and sell high. This misses the point of the risk-sharing discussion that many participants enter financial markets not to speculate/invest, but to transfer risk – and spot transactions may not be the best way to accomplish that.

Let us introduce the *time of delivery* into the picture. Let us relax the assumption that all trades of securities for cash are immediate. An equity investor may agree today to buy a stock for a certain price, but to deliver cash and receive the stock 1 year from today. The investor is entering into a *forward buy* transaction. His risk profile is drastically different from that of a spot buyer. He is exposed to the value of the stock, but his exposure does not start until 1 year from now. He does not care if the stock drops in value as long as it recovers by his delivery date. He also does not benefit from a temporary appreciation of the stock compared to the spot buyer who could sell the stock immediately. In our time-state risk rectangle with time and stock price on the axes, the forward buy looks like a spot buy, but with a subplane demarcated by today and 1 year from today taken out. Ignoring the time value of money, in Figure 1.1 the area above the forward price line corresponds to a gain, and the area below it to a loss. A forward sell would cover the same subplane, but the "good" and the "bad" areas would be reversed.

In the bazaar of finance, agents buy and sell spot, and they buy and sell forward. The forward is an important speculative and risk transfer tool. For our discussion, it does not matter if, at the future delivery time, an actual exchange of securities for cash takes place, or just a marked-to-market settlement in cash (see Chapter 3). If the stock is trading at €75 in the spot market, it is economically irrelevant whether the parties to a €60 forward transaction exchange cash (€60) for stock (share worth €75) or simply settle the difference of €15. Also, for most purposes, futures contracts can be treated as identical to forwards, even though they involve a daily settlement through a margin account. Forwards and futures attract speculators and hedgers. They first use their information to bet on the direction of the price in order to profit

or risk share; the latter use their skill to arbitrage the mispricing between spot and forward transactions in the same asset.

Let us now further complicate the view of the markets by introducing the concept of *contingent delivery time*. An exchange of a security for cash, agreed upon today, is not only delayed into the future but is also made contingent upon a future event or condition. The simplest example is an insurance contract. The payment on a $1,000,000 life insurance policy takes place only upon the death of the insured person. The benefit is agreed upon and fixed up front between the policyholder and the issuing company. Hazard insurance (fire, auto, flood) is different from life in that the amount of the benefit depends on the "size" of the future event. The greater the damage, the greater the payment. An option contract is similar to a hazard insurance policy. The option payout depends on the value of the underlying financial variable in the future (see Chapters 5 and 6). A put option on the S&P 100 stock index pays the difference between the selected strike price and the value of the index at some future date times $100, but only if the index goes down below that strike price level. The buyer insures against the index going down; the more the index goes down the more benefit he obtains from the put. A *cap* on an interest rate index provides the holder with a periodic payment every time the underlying interest rate goes above a certain level. A borrower may use a cap to protect against interest rate hikes.

Options involve risk sharing, not only when buying protection, but also when selling protection. A borrower relying on revolving credit with a floating interest rate defined as spread over 3-month LIBOR can *sell* a *floor* to offset the cost of the borrowing. When the index rate goes down, he makes payments to the floor buyer. He willingly accepts that risk because when rates go down and he makes the floor payments, the interest he pays on the revolving loan also declines. In effect, the floor fixes the minimum borrowing rate in exchange for an up-front premium.

Options are not the only forms of contingent claims traded in today's markets. In fact, the contingent delivery feature, often referred to as "optionality," is quite common. Buyers of convertible bonds exchange their bonds for shares when interest rates and/or stock prices are high, making the post-conversion equity value higher than the present value of the remaining interest on the unconverted bond. Issuers call outstanding callable bonds when interest rates decline below a level at which the value of those bonds is higher than the call price. Adjustable mortgages typically contain periodic caps which prevent the interest rate, and thus the monthly payment charged to the homeowner, from changing too rapidly between periods. Many bonds have credit covenants that require the issuing company to maintain certain financial ratios; non-compliance triggers automatic repayment or default. Car lease agreements give the lessees the right to purchase the automobile at the end of the lease for a prespecified residual value, and lessees exercise those rights when the residual value is sufficiently lower than the market price of the vehicle. In many countries, including the USA, the homeowners with fixed-rate mortgages can prepay their loans partially or fully at any time without penalty. This feature allows the homeowners to refinance their loans with new ones when interest rates drop by a significant enough margin. The cash flows from the original fixed-rate loans are thus contingent upon interest rates staying high. Other examples abound.

The key to understanding complex securities is to break them down into simpler components: spot, forward, and contingent delivery. The components may trade separately in the wholesale markets, but are more likely to be bundled together for retail customers or original (primary market) acquirers. Not uncommonly, they are unbundled and rebundled several times during their lives.

All financial market evolve to have three structural components: the market for spot securities, the market for forwards and futures, and the contingent securities market which includes options and other derivatives.

Most of the activity of the last two forms is reserved for institutions, which is why most people are unaware of them. Yet their dynamic risk-sharing functions are necessary for the smooth operation of the spot markets. They constantly signal the changing price of risk to the "bundled" value of the spot securities. In some respects, the spot securities are the most complicated types from the informational content perspective. Their value reflects all available information about the financial prospects of the broad market and the entity that issued them, and is equal to the sum of the values of all state-contingent claims that can be viewed as informational units. The value of forwards and option-like contracts is tied to more narrow information subsets. These contracts have expiry dates that are short relative to the underlying security and are tailored to specific dimensions of risk. They allow the unbundling of the information contained in the spot security. This function is extremely desirable to holders of cash assets as it offers them a way to sell off undesirable risks and acquire desirable ones at various points in time. If you own a bond issued by a tobacco company, you may be worried that legal proceedings against the company may adversely affect the credit spread of the bond you hold. You could sell the bond spot and repurchase it forward with the contract date set far into the future. You could purchase an option on the yield spread or a put option on the bond, or sell calls on the bond. All of these activities would allow you to share the risks of the bond with another party and tailor the duration of the risk sharing to your needs.

1.4 ARBITRAGE: PURE VERSUS RELATIVE VALUE

We introduce the notion of *relative value arbitrage* which drives the trading behavior of financial firms irrespective of the market in which they operate. Relative arbitrage takes the concept of *pure arbitrage* beyond its technical definition of riskless profit. All primary market risks are eliminated, but some secondary market exposures are deliberately left unhedged.

Arbitrage is defined in most textbooks as riskless instantaneous profit. It occurs when the *law of one price* – which states that the same item cannot sell at two different prices at the same time – is violated. The same stock cannot trade for one price at one exchange and for a different price at another unless fees, taxes, etc., are involved, but, if it does, traders will buy it on the exchange where it sells for less and sell it on the exchange where it sells for more. Buying Czech korunas with British pounds cannot be more expensive than buying dollars with pounds and using dollars to buy korunas. If one can get more korunas for pounds by buying dollars first, no one will buy korunas for pounds directly. Anyone with access to both markets will buy korunas through dollars and immediately sell them for pounds to realize an instantaneous and riskless profit. This is a very simple example of *pure arbitrage* in the spot currency markets. Pure arbitrage can take a *static* form, where the trade is put on at the outset and liquidated once at a future date – e.g. trading Forward Rate Agreements against spot LIBORs for two different terms (see Chapter 3) – or a *dynamic* form, in which the trader commits to a series of steps that guarantee the elimination of all directional market risks and ensure riskless profit upon completion of these steps (see Chapters 4 to 7). A bond dealer may purchase a callable bond from the issuer, buy a swaption from a third party to offset the call

risk, and delta-hedge the rate risk by shorting some bullet swaps. He guarantees a riskless profit provided that neither the issuer nor the swaption seller defaults. Later chapters abound in detailed examples of both static and dynamic arbitrage.

Definition *Pure arbitrage is defined as generating riskless profit today by statically or dynamically matching current and future obligations to exactly offset each other, inclusive of incurring known financing costs.*

Opportunities for pure arbitrage in today's ultra-sophisticated markets are limited. The money-making activities of most institutions rely on the principle of *relative value arbitrage*. Hedge funds and proprietary trading desks of large financial firms employ relative arbitrage techniques. Relative value arbitrage consists of a broadly defined hedge in which a close substitute for a particular risk dimension of the primary security is found, and the law of one price is applied as if the substitute was a perfect match. Typically, the position in the substitute is opposite to that in the primary security in order to offset the most significant or unwanted risk inherent in the primary security. Other risks are purposely left unhedged: if the substitute is well chosen, the risks are controllable (except in highly leveraged positions) and the acceptable risks can be precisely isolated. Like pure arbitrage, relative arbitrage can be both *static* and *dynamic*. Let us consider examples of static relative arbitrage.

Suppose you buy $100 million of a 30-year US government bond. At the same time you sell (short) $102 million of a 26-year bond. The amounts $100 and $102 are chosen through "duration matching" (Chapters 2 and 13) which ensures that when interest rates go up or down the gains on one position exactly offset the losses on the other. The only way the combined position makes or loses money is when interest rates do not change in parallel, i.e. the 30-year rates change by more or less than the 26-year rates. The combined position is not risk free. It is speculative, but only in a secondary risk factor. Investors seldom distinguish between 30- and 26-year rates; they worry more about the overall level of rates. The two rates tend to move closely together and the relative arbitrageur bets that they will diverge.

The bulk of swap trading (Chapter 4) relies on static relative arbitrage. An interest rate swap dealer agrees to pay a fixed coupon stream to a corporate customer, himself an issuer of a fixed-rate bond. The dealer hedges by buying a fixed-coupon government bond. He eliminates any exposure to interest rate movements as coupon receipts from the government bond offset the swap payments, but he is left with a swap spread risk. If the credit quality of the issuer deteriorates, the swap becomes "unfair" and the combined position has a negative present value to the dealer.

Dynamic relative arbitrage is more complicated in that the hedge must be rebalanced continuously according to very specific computable rules. A seller of a 3-year over-the-counter (OTC) equity call may hedge by buying 3- and 6-month calls on the exchange and shorting some of the stock. He then must rebalance the number of shares he is short on a daily basis as the price of those shares fluctuates. This so-called delta hedge (Chapters 5 and 6) eliminates exposure to the price risk. The unhedged exposure is to the implied volatility differences between the options sold and bought. In the preceding static swap example, the swap dealer may elect not to match the cash flows exactly on each swap he enters into. Instead, he may trade a small (duration-matched) number of "benchmark" bonds in order to offset the cash flows in bulk. The shortcut, however, will require him to dynamically rebalance the portfolio of bonds.

This book's main goal is to explain the functioning of financial markets by defining pure and relative value arbitrage linkages between different market segments. The examples appear

complicated as they involve multiple futures, options and other derivatives, but they all relate to the same simple principle of profit through selective risk elimination.

Definition *Relative value arbitrage is defined as generating profit today by statically or dynamically matching current and future obligations to nearly offset each other, net of incurring closely estimable financing costs.*

To an untrained eye, the difference between relative value arbitrage and speculation is tenuous. To a professional, the two are easily discernible. An equity trading strategy called "pairs trading" is a good case in point. The strategy of buying Pfizer (PFE) stock and selling GlaxoSmithKline (GSK) is pure speculation. One can argue that both companies are in pharmaceuticals, both are large with similar R&D budgets, and both tend to move together with the pharmaceutical sector as a whole. The specific risks of the two companies, however, are quite different and they cannot be considered close substitutes. Buying Polish zlotys with British pounds and selling Czech korunas for British pounds is also speculation, not relative value arbitrage. Zlotys and korunas are not substitutes. An in-between case, but on the speculative side, is called a *basis trade*. If an airline needs to lock in the future prices of jet fuel, then instead of entering into a long-term contract with a refiner, it buys a series of crude oil futures with the idea that supply shocks that cause oil prices to rise affect jet fuel prices in the same way. When prices increase, the airline pays higher prices for jet fuel, but the profits from oil futures offset those increases, leaving the total cost of acquiring jet fuel unchanged. Buying oil futures is appealing as it allows one to liquidate the protection scheme when prices decline instead of rising, or to exit half way through an increase. This trade is not uncommon, but it exposes the airline to the *basis* risk. When the supply shocks take place at the refinery level (not the oil delivery level), spot jet fuel prices may increase more rapidly than crude oil futures.

Derivatives dealers want to make money on the bid–ask spread of their trading contracts. They rely on the relative value arbitrage principle to temporarily hedge the directional risk as they seek the other sides of the trades. When they sell options, they buy or sell the underlying stocks, bonds, or mortgages in the right proportions to exactly offset the value changes of the option and the underlying, repeating the exercise every day until the options expire or are offset. The hedge proportions change every day, depending on the changing market factors – such as the primary and secondary risks – to which the dealers are exposed. The dynamic rebalancing serves to offset the primary risks, but it does not offset all the risks. In this book, we learn how to (a) construct relative value trades with the right hedge ratios (deltas, durations) and (b) reduce the risk down to desired secondary factors (e.g. vega).

Relative value arbitrage in many markets relies on a building block of a static or dynamic *cash-and-carry* trade. The static version of the cash-and-carry trade (introduced in Chapter 3) consists typically of a spot purchase (for *cash*) and a forward sell, or the reverse. The dynamic trade (introduced in Chapters 5 and 6), as in the preceding option example, consists of a series of spot purchases or sales at different dates and a contingent payoff at the forward date. The spot and forward are tied together by the cost of financing, the *carry*, of the borrowing to buy spot or lending after a spot sale. Even the most complicated structured derivative transactions are combinations of cash-and-carry building blocks across different markets. When analyzing such trades, focusing on institutional and market structure details in each market can only cloud this basic block of arbitrage. In this book, we emphasize the common elements. We exploit the principle of arbitrage to show what motivates trades *in* each market (stock index futures vs stocks, fixed coupon stripping of bonds, triangular arbitrage in currencies) and *between*

markets (simultaneous trades in currencies in money markets, hedging mortgage servicing contracts with swap options, etc.).

Many readers view the *no-arbitrage conditions* found in finance textbooks as strict mathematical constructs. They are not mathematical at all. The equations do not represent the will of God, like gravity or thermodynamics laws in physics. They are ensured by the most basic human characteristic: *greed*. Dealers tirelessly look to discover the violations of no-arbitrage, i.e. opportunities to buy an item at one price and sell a disguised version of that item for another price. By executing trades to take advantage of the temporary deviations from these paramount rules, they eliminate them by moving prices until money cannot be made and, by extension, the equations are satisfied.

In this book, all the mathematical formulas are traced back to the financial transactions that motivate them. The math serves to get the trade ratios right, but the key is to learn what to do to profit when the math is not satisfied in the markets. We overemphasize the difference between the extremes of *speculation* and *pure arbitrage* in order to bring out the relative value arbitrage (mis-called *risk arbitrage*). Apart from tiny commissions, traders earn profit from "spread" – a reward for relative value risk arbitrage. A swap trader, who fixes the borrowing rate for a corporate client, hedges by selling Treasury bonds. He engages in a relative value trade (swaps vs government bonds) that exposes him to swap spread movements. A bank, that borrows by opening new checking deposits and lends by issuing mortgages, eliminates the risk of parallel interest rate movements, but leaves itself exposed to yield curve tilts (non-parallel movements) or default risk. In all these cases, the largest risks (the exposure to interest rate changes) are hedged out, and the dealer is only exposed to secondary ones (swap spread, default).

Under our definition, most of what is conventionally labeled *investment*, qualifies as *speculation*. Over a long time, stocks should rise as the economy grows and productivity increases. Yet a stock investor, who directly or indirectly through pension and mutual funds "invests," but does not hedge or risk-share in some way, takes 100% of the price risk. He speculates, with positive odds perhaps. Financial institutions also do this: as their assets grow, they put their capital to use in new products and services. They speculate on their success.

The trading activity of many institutional dealers is *not* driven by the outright buy-low/sell-high speculation. To avoid taking primary risks by speculating on markets going up or down, traders hedge the primary risks; they leave themselves exposed only to secondary "spread" risks. Well-managed financial institutions are compensated for knowing and taking those secondary risks; poorly managed ones lose money betting on primary risks. Nearly everyone has heard of the Barings, IG Metallgesellschaft, and Orange County fiascos of the 1990s. AIG sold big bets on the default risk without knowing or hedging any of them, and lost heavily in 2008. History is filled with examples of financial institutions that were bankrupted as a result of gambling.

Institutional trading floors are designed to best take advantage of relative arbitrage within each market and between markets. Individual *trading desks*, surrounded by associated marketing and clearing teams, cover customers within a specific market segment. Trading desks that are likely to buy each other's products are placed next to each other. Special *proprietary desks* (for short called *prop* or *arb desks)* deal with many customer desks of the same firm or other firms and many outside customers in various markets. Their job is to focus on relative value trades or outright speculation across markets. The distinction between the customer vs proprietary desks is in constant flux as markets expand and shrink and desks collaborate with each other. For example, a money market desk arranges an issuance of short-term paper whose coupon depends on a stock index. It then arranges a trade between the customer and its

swap desk to alter the interest rate exposure profile and between the customer and the equity derivatives desk to eliminate the customer's exposure to equity risk. The customer ends up with low cost of financing and no equity risks.

1.5 FINANCIAL INSTITUTIONS: TRANSFORMING INTERMEDIARIES VS BROKER-DEALERS

From a macroeconomic perspective, financial institutions can be broadly divided into two categories based on their *raison d'être*:

- asset transformers
- broker-dealers.

The easiest way to identify them is by examining their balance sheets. The assets of asset transformers are different from their liabilities. Broker-dealers may have different mixes, but the categories tend to be the same.

An asset transformer is an institution that invests in certain assets, but issues liabilities in a form that is designed to appeal to a particular group of customers. The best example is a commercial bank. On the asset side, a bank issues consumer (mortgage, auto) and business loans, invests in bonds, etc. The main form of liability it issues is checking accounts, saving accounts, and CDs. Customers specifically desire these vehicles as they facilitate their day-to-day transactions and often offer security of government insurance. For example, in the USA the FDIC guarantees all deposits up to $250,000 per customer per bank. The bank's retail customers do not invest directly in the bank's assets. This would be quite inconvenient as they would have to buy "bulky" assets with undesirably long maturity that entails price risk if they are sold quickly, and only offered in large denominations. In order to attract funding, the bank repackages its mortgage and business loan assets into liabilities, such as checking accounts and CDs, that have palatable characteristics – instant bankomat access, small denomination, short maturity, and deposit insurance. Another example of a "mild" asset transformer is a mutual fund (or a unit investment trust). A mutual fund invests in a diversified portfolio of stocks, bonds, or money market instruments, but issues small denomination, easily redeemable, participation shares and offers a variety of services such as daily net asset value calculation, telephone/internet fund redemption and exchange, or a check-writing ability. Other "strong" asset transformers are insurance companies. They invest in real estate, stocks, and bonds, but issue policies with payouts tied to life or hardships events (liabilities).

Because they participate in the very important cycle of capital flow between individuals and business – including money/credit creation (see later, Figure 13.1) – asset transformers are subject to special regulations and government supervision. Banks require bank charters to operate, are subject to central bank oversight, and must belong to deposit insurance schemes; the regulation of mutual funds is aimed at protecting small investors (e.g. as provided for by the Investment Company Act in the USA); and insurance company rates are often sanctioned by state insurance boards. The laws in all these cases set specific forms of legal liabilities that asset transformers may create and sound investment guidelines they must follow (e.g. percentage of assets in a particular category). Asset transformers are compensated largely for their role in repackaging their assets with undesirable features into liabilities with customer-friendly features – and that very activity automatically introduces risks into their operations. Bank liabilities have a much shorter duration (checking accounts) than their assets (fixed-rate mortgages). If interest rates do not move in parallel, the spread they earn (interest differential

between rates charged on loans and rates paid on deposits) fluctuates and can be negative. They pursue relative value arbitrage in order to reduce this *duration gap*. Insurance companies deal with largely unhedgeable risks, and utilize reinsurance and securitization to share the risk.

Broker-dealers are different. They do not change the form of the securities they own and owe. They buy stocks, currencies, mortgage bonds, leases, etc., and sell the same securities. As dealers, they own them temporarily before they sell them, exposing themselves to market risks; as brokers, they match buyers and sellers.

Broker-dealers play an important role in the capital transfer from individuals to business through primary sale and secondary resale transactions, transferring securities from the original issuers to buyers as well as from existing owners to new owners. The first function is known as *investment banking* or *corporate finance*, the latter as *dealing* or *trading*. The purest forms of broker-dealers exist in the USA and Japan where the laws have historically separated them from other forms of banking. Securities firms in those two countries are pure broker-dealers (investment banking, institutional trading, and retail brokerage) with the addition of asset-transforming businesses of asset management and lending. In continental Europe, financial institutions are conglomerates, and are commonly referred to as *universal banks* as they combine both functions. In recent years, with the repeal of the Glass–Steagal Act in the USA and the wave of consolidations on both sides of the Atlantic, the US firms have converged more closely to the European model (Bank of America Merrill Lynch). Broker-dealers tend to be less regulated than asset transformers with the focus of the laws primarily on small investor protection (securities disclosure, fiduciary responsibilities of advisers, etc.). Post-2008 regulations have, however, brought them closer to banking regulations, but not fully.

Asset transformers and broker-dealers compete for each other's business. Securities firms engage in secured and unsecured lending and offer check-writing in their brokerage accounts. They also compete with mutual funds and exchange-traded funds (ETFs) by creating bundled or indexed securities designed to offer the same benefits of diversification. Commercial banks securitize credit card and mortgage loans to trade them out of their balance sheets. The trend globally has been toward *disintermediation*, i.e. securitization of previously transformed assets into standardized tradeable packages with retail customers increasingly gaining access to these new markets.

1.6 PRIMARY (ISSUANCE) AND SECONDARY (RESALE) MARKETS

From the societal welfare perspective, the primary role of financial markets has always been to transfer funds between suppliers of excess funds and their users. The users include businesses that produce goods and services in the economy, households that demand mortgage and consumer loans, governments that build roads and schools, financial institutions, and many others. All these users of capital undertake activities that are deemed economically and socially desirable. Throughout history, bankers and banks made the transfer of funds possible by accepting funds from depositors and lending them to kings and commercial ventures. The transition from feudalism to capitalism ushered in asset markets and the transfer of capital through shares of limited liability companies and bonds issued by sovereigns and corporations. Stock, bond, and commodity *exchanges* were formed to allow original investors in these securities to efficiently share the risks of these instruments with new investors. This induced many suppliers of funds to willingly become investors as the risks of holding "paper" assets were diminished. "Paper" could be sold and funds recovered. A specialized class of traders

emerged who dealt only with trading "paper" on the exchanges or over-the-counter (OTC). At the same time, the role of finding productive ventures in need of capital also shifted from bankers to *investment bankers* who, instead of using their own capital to grant loans, specialized in creating new shares and bonds and selling them to investors. This requires a considerable amount of expertise. Prior to the launch of any issue, the main job of an investment banker and his *corporate finance* staff, like that of a loan banker, is to evaluate the issuing company's business and financial condition, and prepare a valuation analysis for the offered security.

Financial markets for securities are organized into two segments, defined by the parties to a securities transaction:

- Primary markets
- Secondary markets.

This segregation exists only in securities, not in private-party contracts like OTC derivatives. In private contracts, the primary market issuers also tend to be the secondary market traders, and the secondary market operates through assignments and mark-to-market settlements rather than through resale.

In *primary markets*, the suppliers of funds transfer their excess funds directly to the users of funds through a purchase of securities. An investment banker acts as an intermediary, but the paper-for-cash exchange is between the issuing company and the investor. The shares are sold either publicly, through an initial public offering (IPO) or a seasoned offering, or privately through a *private placement* with "qualified investors," typically large institutions. Securities laws of the country in which the shares are sold spell out all the steps the investment bank must take to bring the issue to market. For example, in the USA the shares must be registered with the Securities and Exchange Commission (SEC), and a prospectus must be presented to new investors prior to a sale, etc. Private placements follow different rules, the presumption being that large qualified investors need less protection than retail investors. In the USA they are governed by Rule 144-A which allows their subsequent secondary trading through a system similar to an exchange.

In *secondary markets*, securities are traded between investors without the involvement of the issuer. Secondary markets can be organized as exchanges or as OTC networks of dealers connected by phone or computer, or a hybrid of the two. The Deutsche Börse and the New York Stock Exchange (NYSE) are examples of organized exchanges. It is worth noting, however, that exchanges differ greatly from each other. The NYSE gives access to trade flow information to human market-makers called *specialists* to ensure the continuity of the market-making in a given stock, while the Tokyo Stock Exchange is an electronic market where continuity is not guaranteed but no dealer can earn monopoly rents from private information about buying and selling. Corporate and government bond trading are the best examples of OTC markets. There, as in swap and currency markets, all participants are dealers who trade one-on-one for their own account. They maintain contact with each other over a phone and computer network, and jointly police the fair conduct rules through industry associations. For example, in the OTC derivatives markets, the International Swap Dealers Association (ISDA) standardizes the terminology used in quoting the terms and rates, and formalizes the documentation used in confirming trades for a variety of swap and credit derivative agreements. The best example of a hybrid between an exchange and an OTC market is the NASDAQ in the USA. The exchange is only virtual, as participants are connected through a computer system. Access is limited to members only and all members are dealers.

The landscape of exchange trading has seen many changes over the last 10 years. Many exchanges have merged, and human-intensive trading floors have given way to electronic platforms. The Chicago Mercantile Exchange (CME) swallowed its cross-town rivals. The Deutsche Börse made a bid for NYSE Euronext in 2011. The electronic International Securities Exchange (ISE) has wrestled half the market share of all US stock option trading from the Chicago Board of Options Exchange (CBOE). Stock trading has fragmented significantly with volume diverted from the exchanges to electronic communications networks (ECNs) and anonymity-providing "dark pools," and many brokerages internalizing retail flow. The global stock markets continue to be quite fragmented with clearing done mostly locally.

Developing countries strive to create smooth functioning secondary markets. They rush to open stock exchanges even though there may only be a few companies issuing shares. In order to improve the liquidity of trading, nascent exchanges sometimes deliberately limit access and time of trading. All these efforts are aimed at funneling all buyers and sellers into one venue. This parallels the goals of the specialist system on the NYSE. The governments in developing countries also strive to establish well-functioning government bond markets, issuing short-term obligations first and introducing longer maturities as soon as the market shows an appetite for them.

The main objective in establishing these secondary trading places is to lower the cost of raising capital by offering the primary market investors a large outlet for subsequent risk sharing. Unless investors are convinced that they can easily enter – and exit – these securities, they do not buy the equities and bonds offered by the issuers (local businesses and governments). This "tail wagging the dog" pattern of creating secondary markets first is typical not only for lesser-developed nations, but is quite common in introducing any brand new risk class into the marketplace. In the late 1980s, Michael Milken's success in selling highly speculative high-yield bonds to investors relied primarily in creating a secondary OTC market by assuring active market-making by his firm Drexel Burnham Lambert. Prior to its collapse in 2002, Enron's success in originating energy forwards and contingent contracts was driven by the company's ability to establish itself as a virtual exchange of energy derivatives (with Enron acting as the monopolist dealer, of course). In both of these cases, the firms behind the creation of these markets failed, but the primary and secondary markets they started remained strong. Newer examples of this "secondary market first" phenomenon include the expansion of trading of private placement shares in the USA, the emergence of the market in private equity secondaries, the creation of OTC and trading in synthetic collateralized debt obligations (CDOs, Chapter 10), or Goldman's floating of Facebook's and other venture-funded companies' shares prior to their registration in 2011.

1.7 MARKET PLAYERS: HEDGERS VS SPECULATORS

Without risk sharing, issuers and investors live and die with the markets. When prices increase, investors who have bought, gain; when stock prices decline, they lose. New investors "buy high" when prices rise, but "buy low" when prices decline. The decline benefits past issuers who "sold high." The rise hurts them since they received little money and now have to deliver cash flows. In this view of the markets, both sides – the issuers and the investors – *speculate* on the direction of stock prices and interest rates. The word *investment* is a euphemism for *speculation*. The logic does not change if we allow shorting of securities. The shorting allows investors to become synthetic issuers and benefit from prices going down, but they still speculate. Investors manage risk, enhance or mitigate it, by concentrating or diversifying the

types of assets held. An equity investor may hold shares of companies from different industrial sectors; and a pension fund may diversify investments across domestic and foreign equities, or domestic and foreign bonds. The investor can also choose to be *long* or *short* an exposure.

It is not always clear what is safe and what is risky. It is very important to realize that the predictability of the cash flows does not imply low risk and the unpredictability does not imply high risk. Price uncertainty may be safer than future price certainty.

Sparkasse savers in Germany, postal account holders in Japan, and investors in US Treasury Bills avoid default risk and are guaranteed a positive nominal return on their savings. T-Bill and CD investors in the US lock in the rates until maturity of the instruments they hold. Are they then risk-free investors and not speculators? They certainly can calculate in advance the exact dollar amount their investment will pay at maturity. After subtraction of the original investment, the computed percentage return will always be positive; yet, by locking in the cash flows, they are forgoing the chance to make more. If, while they are holding their CD, reinvestment rates increase, they will have lost the extra *opportunity* return they could have earned. We are hinting here at the notion of *opportunity cost of capital* which is common in finance.

Let us consider another example. John Smith uses the $1,000 he got from his uncle to purchase shares in XYZ Corp. After 1 year, he sells his shares for $1,100. His annual return is 10%. Adam Jones borrows $1,000 at 5% from his broker to purchase shares in XYZ Corp. After 1 year, he sells his shares for $1,100. His annual return is 10% on XYZ shares, but he has to pay 5% or $50 interest on the loan, so his net return is 5%. Should we praise John for earning 10% on his capital and scold Adam for earning only 5%? Obviously not. Adam's cost of capital was 5%. So was John's! His was the nebulous opportunity cost of capital, or a *shadow cost*. He could have earned 5% virtually risk free by lending to the broker instead of investing in risky shares. So his relative return, or *excess return*, was only 5%. In the T-Bill or CD example, one can argue that an investor in a fixed-rate CD is a speculator as he gambles on the rates not increasing prior to the maturity of his CD. The fact that his net receipts from the CD at maturity are guaranteed to be positive is irrelevant. There is nothing special about a 0% threshold for your return objective (especially if one takes inflation into account).

In the context of this book, all investors who take a position in a risky asset, whether by borrowing or using owned funds, will be considered *speculators*. The definition is relative to the cost of capital. In this sense, both Adam and John speculate by acquiring shares whose rate of return differs from their cost of capital of 5%. An outright CD investment is speculative as the rate on the CD is not guaranteed to be the same as that obtained by leaving the investment in a variable rate money market account. A homeowner who takes out a fixed-rate mortgage to finance a house purchase is a speculator, even though he fixes his monthly payments for the next 30 years! When he refinances his loan, he cancels a prior bet on interest rates and places a new one. In contrast, an adjustable rate mortgage borrower pays the fair market rate every period equal to the short-term rate plus a fixed margin.

Most financial market participants (Chapters 11 to 14) can be divided into two categories based on whether their capital is used (a) to place bets on the direction of the market prices or rates, or (b) to finance holdings of sets of transactions which largely offset each other's primary risks:

- *Speculators* – These are economic agents who take on explicit market risks in order to earn returns in excess of their cost of capital. The risks they are exposed to through their investments are not offset by simultaneous "hedge" transactions.

- *Hedgers* – These are economic agents who enter into simultaneous transactions designed to have offsetting market risks in such a way that the net returns they earn are in addition to their cost of capital.

All arbitrageurs, whether pure or relative, are hedgers. They aim to earn nearly risk-free returns after paying all their financing costs. A pure arbitrageur's or strict hedger's returns are completely risk free. A relative arbitrageur's returns are not risk free; he is exposed to secondary market risks.

Investors use their capital to speculate. The capital is in the form of an outside endowment. Mutual funds obtain funds by shareholders sending cash; pension funds obtain capital from payroll deductions into retirement accounts; insurance companies sell life or hazard policies and invest the premiums in stocks, bonds, and real estate; while individual investors deposit cash into their brokerage accounts in order to buy, sell, or short sell stocks and bonds. In all these cases, the investors use their funds (i.e. sacrifice their cost of capital) to bet on the direction of the market they invest in. Through the fees they pay, they buy the services of broker-dealers who facilitate their investment strategies. In order to help investors improve the precision of the bets they take, broker-dealers (who, themselves, are hedgers by nature) invent new products which they "sell" to the investors. These can be new types of bonds, warrants, and other derivatives; new classes of shares, or new types of trusts and annuities. The division of players into speculators and hedgers is often replaced by alternative, less precise terms:

- *Buy-side* participants
- *Sell-side* participants.

Buy-side players are investors who do not originate the new investment vehicles. They select from a menu offered to them by the sell-side players. The sell-siders avoid gambling and use their capital to finance the hedge, i.e. to "manufacture" the new products. As soon as they "sell" them, they enter into largely offsetting trades or relative arbitrage strategies. In the latter case, the sell-siders' hedge strategies are imperfect and take time to arrange, which is when sell-siders act as speculators. The hedger/speculator is not exactly equivalent to the sell-side/buy-side division. Although sell-siders often act as both hedgers and speculators, their mindset is more tuned to that of the hedger ("to find the other side of the trade"). Buy-siders enter into transactions with sell-siders in order to become exposed to – or alter how they are exposed to – market risks ("to get in on a trade").

Geographically, the sell-side resides in global financial centers such as New York or London and is represented by the largest global banks and broker-dealers. The buy-side is dispersed and includes all smaller banks with mostly commercial business, all mutual and pension funds, university endowments, insurance companies, and all finance corporations. Larger regional banks in the USA have traditionally been buy-side institutions, but some started their own institutional trading businesses. Since the 1990s, some insurance companies established sell-side subsidiaries and used their capital strength and credit rating to compete vigorously with broker-dealers. Most of these have the phrase "Financial Products" inserted in their name, e.g. Swiss Re Financial Products or AIG Financial Products.

One type of company that can, by design, be both buy-side and sell-side is a hedge fund. Hedge funds are capitalized like typical speculators (*read*: investment companies). They are entrusted with partnership capital in order to "invest." Yet almost all hedge fund strategies are some form of relative value arbitrage, i.e. the strategies are hedges. The original capital is

used only to acquire leverage and to replicate the hedge strategy as much as possible. In the early years of hedge funds (the mid-1990s), they were buy-siders. They innovated on what risks to take, but used contracts off-the-shelf from dealers. In the 2000s, hedge funds grew so large that in many markets they are now able to wrest control of the demand and supply of the information flow from the dealers and are able to sell hedges to the dealers, effectively becoming sellers of innovative strategies. Dealers and asset management companies have, however, begun to strike back with strategy index products and strategy ETFs which attempt to replicate the returns of hedge funds at lower costs (Chapter 12).

1.8 PREVIEW OF THE BOOK

Many finance textbooks are organized by market segments: stocks, money markets, bonds, real estate, currencies, commodities, etc. This is analogous to reviewing the car industry alphabetically by make, starting with Audi and BMW, and ending with Volkswagen and Volvo.

This book is arranged structurally. First, we learn the common features of all the segments: spot, forward, and option contracts, analogous to describing the car engines, body, safety features, and interior comforts. Second, we review some highly structured products (floating notes, mortgage securities, and CDOs) similar to showcasing finished cars (small Fiat 500, mid-size Honda Accord, and larger Porsche Cayenne). Last, we cover the participants in the markets and the problems they are trying to solve. This allows the reader to fully understand the internal workings of the markets, rather than learn about unimportant institutional details. The book is thus divided into three parts.

- **Part I: Relative Value Building Blocks** – Chapters 2–7 cover spot, forward/futures, options, swaps, and credit derivatives; they review the mechanics of the transactions and the arbitrage linkages within and across markets, as well as pricing methods.
- **Part II: Cash Flow Engineering** – This part is definitely not exhaustive; we devote just three chapters (Chapters 8–10) to highlight those markets that exhibit very complex cash flow diversion rules; one can legitimately claim that in many cases they are over-engineered: structured floaters with inverse, cap, and call features, mortgage-backed securities subject to sequential tranching and planned amortization schemes, and cash and synthetic CDOs with default risk tranching;
- **Part III: Players** – In Chapters 11–14, we focus on the main participant groups on the demand side: individuals planning for retirement or investing actively by valuing securities; hedge funds striving to identify relative value arbitrage alpha; banks trying to solve the perennial duration gap problem of their long assets and short liabilities; and the private markets players – pension funds, private equity, and venture capital. We omit the capital deficit agents/suppliers of securities: corporations and governments and we also omit mildly asset transforming mutual funds that engineer basket vehicles for individuals. We split the ETFs between Chapters 8, 11, and 12 – their structuring and their replication role for individuals and hedge funds.

The objective is to keep things simple. In Parts I and II we use cash flow diagrams and tables in place of equations, and we digest the complicated theory of risk–return management for the players in Part III down to concrete real-life numeric and accounting examples.

Parts I, II, and III may appeal to different audiences. Part I is a must read for those wanting to work in trading, structuring and hedge funds. It provides the fundamentals of building relative

value trades and pricing. Part III is a must read for investment and derivative marketing, investment banking candidates and general economics candidates. It provides the basics of security valuation, asset-liability management and private equity processes. Part II should be of interest to both groups. While not titled "Financial Markets for Dummies," the entire book should be readable by all college graduates interested in finance, including accountants, doctors and engineers. I don't know about politicians. . .