

| PART I |

# **ANALYTIC TOOLS**

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## Risk and Return

The reader for whom this volume is intended is no doubt already thoroughly aware of the intimate relationship between risk and return, so there is no need to rehearse the usual clichés about the availability of free lunch, the obverse and reverse of coins, the relationship between timber growth and the sky, and so forth. The analyses found here rely on the premise that understanding the returns that investment vehicles produce means understanding the risks that they take. My contention that the palette of available return-generating risks is fundamentally the same for all investment vehicles, and that the risks are quite limited in number, informs my expectation that it will be possible to uncover some useful continuity of analysis between conventional and alternative investments.

This book seeks the common features that permit comparison and, ultimately, a rationally grounded approach to allocation among a range of investment opportunities that includes both conventional and alternative investments within its scope. In this endeavor, it is useful to draw a distinction between investment strategies, return enhancers, and volatility generators. Investment strategies are the fundamental sources from which investment returns derive—they are the risks that investment managers must take in order to generate any return at all. I have been able to identify only three of them, although they frequently operate in combinations that produce the wide variety of very differently structured return streams available to investors. This chapter will examine these investment strategies and the two quite distinct roles that time plays in the context of investment.

Return enhancers are applied to investment strategies in order to make their return streams more attractive, whether from a risk or a return perspective. Almost all of them involve risks of their own, as the most notable and common of them—leverage and tactical allocation or style rotation—certainly do. However, they do not themselves produce the returns that investors seek but rather accentuate the returns generated by one of the investment strategies (although this requires some footnoting in the case of tactical allocation). The strategies to which return enhancement techniques are applied provide the targeted returns, and in most cases one can regard return enhancers as overlays on those strategies.

Volatility generators are uses of investment assets for purposes other than generating return: they generally employ one of the investment strategies, but for the purpose of trading around its volatility rather than, or at least more than, for capturing those returns themselves. In fact, those who exploit volatility generators (typically investment banks) usually sell those underlying returns to other investors, retaining for their own purposes only the exposure to the tradable volatility that they provide. Return enhancers and volatility generators will be discussed in the following chapter.

## The Three Sources of Investment Returns

There is a wild profusion of investment techniques, whether conventional or alternative—a thicket of investment styles that is an affront to tidy minds and an impediment to new initiates' understanding. It does not help that the nomenclature for distinguishing among them is shifting and unruly. However, just three investment strategies underlie the many approaches to investing; all investments derive their returns from one or—as often if not more frequently—a combination of them. As would be expected, each strategy represents a distinct risk. The interplay among them can be complex, and they sometimes appear in unexpected guises. Investment managers may even be unconscious of the fact that several distinct strategies contribute to their returns, and it may be difficult for analysis to determine precisely which strategy is contributing what to returns in any given market circumstance. The pursuit of just these strategies, sometimes amplified through the use of return enhancers, accounts for all the many different ways of confronting the challenges of investment.

The numerous investment styles and disciplines are, at bottom, different approaches to these strategies:

- ❑ *Directional strategies* purchase or sell short to capture anticipated price changes. Their trades may last seconds or years, and their

exposure may be naked or partially hedged. However, any hedge used in conjunction with a directional trade cannot be a complete one, as the returns to this strategy derive from the transaction having at least some net exposure to price movements in the underlying asset or some other changeable factor such as volatility that can provide the source of such a return. A perfect hedge against a purely directional trade would result in no net investment exposure at all, only a loss due to transaction costs.

- *Cash flow strategies* seek returns from the ownership of cash-generating assets. In principle, these strategies are unconcerned with price changes in those assets, and in some circumstances may even achieve their owners' investment objectives without the asset ever being realized. The cash flows anticipated may be regular and specifiable in advance, or they may be intermittent and quite variable in size. These trades can, at least in principle, be perfectly hedged against price movement in the instruments employed while remaining productive of returns, although in most cases hedging is likely to sacrifice a sizable share of those returns.
- *Arbitrage strategies* exploit discrepancies between related prices, generally through pairing long and short exposure to the related instruments. They succeed whether the short position's price rises toward the long position's, the long falls toward the price of the short, or their prices meet anywhere in between. An arbitrage is market-neutral—fully hedged against price movements—provided that the relationship of counter-correlation between the legs of the trade is strong and persistent. Arbitrages are, in the final analysis, exposed to the price convergence of the legs of the trade rather than to the price movement of either leg separately.

It is impossible to prove a negative existential proposition of the form “No other investment strategy exists,” so there is no way to guarantee the completeness of this list, but I know of no investment technique that cannot be reduced to these strategies, although occasionally doing so may require a little imagination. Based on this negative evidence, we can be fairly certain that the list is complete. However, as has become a truism, the belated discovery of black swans (*Cygnus atratus*, taxonomically described in 1790) indicates that negative empirical generalizations are vulnerable to counter-example. There are certainly other sources of return, such as engaging in games of chance, treasure-hunting with a

metal detector, and (if all else fails) work. However, it is appropriate to respond to claims for any of them by employing terminological sleight-of-hand—that is, by simply refusing to regard them as investing activities. If they are not investments, then clearly they cannot deliver investment returns. Investment, according to this view, involves purchase or short sale of one or more assets to exploit its (their) economic characteristics. This might raise the question whether day-trading qualifies as a form of investment, but the fact that price volatility is an economic characteristic, too, ensures that it does.

Three strategies form a small toolkit, but as we will see in Part II of this volume, there is considerable nuance in each of them, and each can be applied quite flexibly whether alone or in combination. Further, they are not asset-specific, and in some cases each can be applied separately to the same asset in order to generate quite different sorts of return streams. Consider distressed debt—a periodically fashionable category of investment that is sometimes (but not exclusively) classified among alternative investments. Arbitrageurs may buy it and take a short position in some other portion of the issuer’s capital structure against it, cash flow investors may hold it to maturity to capture its yield, and directional investors may hold it for some part of its life in the expectation that its credit rating and thus its price will improve: one asset, three investment strategies, and three quite different patterns of return generation. A wide range of assets may be profitably exploited using each of the three strategies.

## Directional Strategies

The purest forms of directional strategies are cash purchase of long positions in physical commodities, collectibles, and equities that do not pay dividends. As it is usually unleveraged, venture capital may also qualify as similarly “pure.” The returns on these investments consist of sale price less purchase price, commissions and storage, or custody costs.<sup>1</sup> The risk to them is an incorrect forecast of the price development of these assets, compounded, as is the case for all investments of any type, by a virtual and unquantifiable factor: opportunity cost. As opportunity

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1. Note that even the “purest” forms of an investment strategy have a cash flow element to them, although it is a negative one. The only investment strategies that are truly “pure” are those not involving acquisition, storage or custody costs, such as keeping the gift of a few gold coins in a dresser drawer. But for the purposes of the discussion here, these negative cash flow elements can be ignored.

cost attaches to every investment except the single best-performing one in any given time period, I will not discuss it further here, but as it is such a universal feature of investment activity, I will return to it later in this volume.

A critical reader may grant physical commodities and collectibles but may object that the value of an equity (and venture capital) is derived from some form of discounting model. This implies that the analysis includes a cash flow element, if only virtual cash flows in the case of equities without earnings or dividends. In response to such an objection, there is clearly no point in denying the point that equity analysis generally does include some form of cash flow modeling. However, note that the actual returns on venture investments or equities that do not pay dividends, as opposed to their expected returns, do not depend on cash flows (virtual or otherwise) generated by the investment. In these cases, the return computation above is unaffected by in- or out-flows of investors' cash apart from those involved in the purchase and sale of the investments, so the return on investment is due solely to price change less costs.

That is, there is a real and potentially very powerful distinction between the *value* or expected return of such an investment and its *price*. Valuation involves discounting, but price is simply what the market delivers (or what can otherwise be negotiated) at any given moment. If price were always identical to value, there would be no opportunities for directional investment—or arbitrage, for that matter. The only possible investment strategy would be the pursuit of cash flow, and assets such as bullion, raw land, or rare postage stamps that do not distribute cash flows to investors could not be regarded as investments at all—thus Black (1976).

The purity of the strategy is reduced as soon as cash flow considerations enter the picture, regardless of whether the cash flow is positive or negative. Consequently, the use of leverage in any form adds an element of cash flow strategy to the investment mix. For example, short sales of any asset are directional strategies with a cash flow admixture, due to negative cash flow incurred in borrowing the assets to permit delivery. If put options or short futures positions are used to establish the short position, an examination of the relevant pricing formulae makes quite clear that there is an interest-rate element involved in those cases as well. Financing a short position that takes either form creates a drag on performance—a negative cash flow—and occasionally an acute one. For example, in the summer of 2008, when it was difficult to locate bank stocks to borrow for the purposes of delivery on short sales,

borrowing rates in some cases exceeded 10 percent *per annum*, which is a hefty performance hurdle. By the fourth quarter of that year, the general availability of credit to hedge funds, for short sales or other purposes, was drying up significantly: see Pulliam and Strasburg (2009).

Ownership of dividend-producing equities quite explicitly includes a positive cash flow element, regardless of whether the dividends are regularly scheduled payments or special dividends that issuers occasionally volunteer or that are extracted from them through investor activism. Cash flows extracted from leveraged buyouts prior to their initial public offerings are another example. Fixed-income instruments purchased in anticipation of yield-curve or credit-rating changes offer an even more cash flow-oriented mixture of strategies. Raw land that has been purchased with cash and that remains undeveloped is a purely directional speculation (apart from the negative cash flows demanded by tax authorities), but returns on undeveloped real estate are unlikely to be compelling without the enhancements of leverage or improvement, which introduce negative cash flow elements. Note, however, that compelling returns on an investment in raw land can be achieved if someone other than its owner—say, a turnpike authority—plans to make those enhancements. The improvement, rather than its underwriter, generates any appreciable directional return on raw land. This wrinkle is the source of some extraordinary directional returns on what would otherwise be a rather unpromising investment category.

The risk to directional strategies is simply that the forecast price movement is not achieved, although this may occur for any of a thousand reasons, some of which may be quite complex and entirely unexpected. Analyzing the factors that might contribute to forecast failure is among directional traders' primary risk-control activities. While this may seem trivial, it further illustrates the distinction between price and value. There is no reason to research the source of directional trades' returns: it is known in advance to be price activity. The *causes* of that price activity give rise to the multimillion-dollar question, keep numerous analysts employed, and are by no means a simple matter.

Hedging a directional strategy does not fundamentally change the strategy, provided that the hedge is imperfect or partial. A perfectly, completely hedged directional strategy is, in effect, no strategy at all: since the returns on directional strategies derive from price exposure, completely vitiating the exposure hedges away the strategy. Imperfect hedges involve elements of arbitrage. The extent to which a short position in a Standard & Poor's 500 Index future hedges a position in an individual equity is a function of the volatilities of the equity and the



index future as well as the relationship of correlation between their price movements. These relationships are subject to constant change, introducing a correlation risk that was not inherent in the original, unhedged directional trade. But partial (rather than imperfect) hedging need not entail arbitrage risk—buying individual-equity put options against a specific security position reduces potential exposure below the option's exercise price without adding any appreciable element of correlation risk. Note the qualifier: no *appreciable* risk, but there is a small amount of arbitrage risk nonetheless, as will be discussed below.

When they run into trouble, all investment strategies become directional, and their direction is never the desired one. Thus, if a loan becomes questionable, the value of the lender's asset plummets even if the lender continues to receive cash flow from it—an experience that has recently become all-too-familiar to holders of mortgages. If an arbitrage relationship weakens, then one or both legs of the trade are likely to move against the trader, and the resulting loss can be expected to be considerably greater than the gain that their convergence was forecast to generate when the trade was initiated. As we will see in the next chapter, when return enhancements go wrong, most of them also become unfortunate directional speculations.

## Cash Flow Strategies

Cash purchase of bonds held to maturity is probably the most familiar form of cash flow investment. Although the bonds' price will fluctuate over the life of the investment, traditional wealth managers have a lot of practice assuring nervous clients that they can ignore that volatility because, barring default, the bond will return to par at maturity. Total return approaches to fixed-income are foreign to their clientele, not least because wealth managers have little incentive to inform them about them. Provided that they always purchase bonds at or below par and avoid fatal credit mishaps, they have a ready if somewhat specious reply to clients who are concerned about declines in the value of their accounts.

Real estate held for income rather than speculative resale also lends itself to cash flow strategies, as aristocrats have known for millennia. The Grosvenor estate, the most valuable portions of which came into his family in the seventeenth century, provides the current, sixth Duke of Westminster with the third-largest fortune in Britain as well as his title. Private equity held for income can also be an excellent cash flow generator. For example, S. C. Johnson & Son, should by rights be called

“S.C. Johnson & Great-Great-Grandson,” while Mars has been closely held for four generations, producing what family members apparently consider satisfactory returns without any recourse to the proceeds that might be generated by exiting the position. Any asset that produces cash flow, from legal settlements and lottery proceeds to life insurance policies on third parties, is suitable for use in this investment strategy.

Use of leverage does not bring a “foreign” element into cash flow strategies—its cost just offsets a portion of their returns. As further exploration of the examples of both the Grosvenor estate and S.C. Johnson & Son would illustrate, borrowing may be in support of development, which will result in higher future cash flow returns if the additional investment proves to be well judged. However, where cash flow distributions are variable in size or in their timing, as in the case of many real assets that generate cash flows, excessive leverage can be quite risky. And the profitability of a trade in which funds are borrowed short-term to lend medium- to long-term is dependent on the persistence of a relationship between interest rates that is arbitrage-like. In effect these trades involve a short position in nearby maturities and a long position in distant maturities. This sort of trade is pursued routinely by banks and direct lending hedge funds and incorporates the risk that the arbitrage may collapse if financing costs rise, if the short-term financing cannot be renewed, or if returns on the loans that are made to third parties decline.

In contrast to assets employed in directional strategies, value and price are identical for assets with stable and predictable cash flows—assuming efficient markets for them. The credit crisis of 2007 to 2009 witnessed wide divergences between the prices and values of such assets, precisely because the disappearance of market liquidity rendered the market inefficient even for many good quality instruments of this type. I am aware of bonds that were quoted at 4000 basis-point bid/ask spreads and bonds that were priced within a 3500 basis-point range depending on which dealer was consulted. This created arbitrage opportunities that alternative investment vehicles, ranging from bond arbitrageurs to leveraged buyout firms, were quick to exploit, to the extent that the restricted liquidity of the relevant markets permitted them to do so.

The risk to cash flow strategies is that the cash flows fail to meet return requirements. This may be due to underperformance by the asset—if, for example, targeted lease or occupancy levels are not obtained or corporate cash flow generation is not as great as anticipated—or due to default in the case of fixed income instruments or other types of loans. As suggested above, their yield-curve exposure is essentially a directional

feature of bonds, but when paired with a mismatched liability, yield-curve exposure can become an arbitrage risk.

In almost all cases, assets suitable for use in cash flow strategies are also suitable for use in directional ones. The principal exceptions are variable-rate and other cash-like instruments, where value and price are even more likely to maintain their identity than they are for fixed-payment instruments. Their lack of directional risk is precisely what makes these instruments appealing as stores of value, as collateral for debt obligations and to risk-averse investors that have not been persuaded to ignore fluctuations in the value of their principal, although various U.S. municipalities have discovered to their cost that even these instruments become directional when their default risk manifests itself.

It has been possible to hedge default risk through insurance ever since insurance began, and latterly it has become possible to hedge credit-market default risk through credit-default swaps and options on swaps. Unlike directional hedges, these instruments offer the possibility of an at least theoretically perfect and complete hedge against issuer default, while in most cases leaving an investor with some cash flow, because swap prices relate to short-term interest rates. As an example, and making some sweeping assumptions on swap pricing, the investor swaps the returns on risky credit for Treasury returns, and consequently retains income, but at a much lower effective rate. However, if the original, risky credit position was financed or if the swap was purchased after the credit's quality had already deteriorated, the cost of the swap may eliminate return or even drive it into negative territory. Default coverage on other cash flow-generating instruments may be negotiated, at considerable cost, with insurers.

## Arbitrage Strategies

Arbitrages involve owning an asset and a complementary short position: acquirers with their targets, derivatives with their underlying, equity with its issuer's other securities, and so forth. Where the values of two assets are related to each other—whether they move in lockstep or are reliably out of step—but market forces have caused their pricing to depart from their theoretical relative values, arbitrage exploits the divergence in their prices. Note, once again, the distinction between “value” and “price.” Arbitrage involves going long the asset that is valued too cheaply and selling short the asset that is too dear, and thus is reliant on a perception of where their values “should” be relative to each other. Because they hedge away any directional exposure to the assets' price changes, arbitrages

succeed regardless of how the values converge—whether the cheap asset’s price rises, the dear asset’s price falls, or their prices converge somewhere in between, the return is the same.

Arbitrage is a finite or bounded trade in terms of its absolute returns and also in time. The return that can be extracted from it is a fixed-dollar amount that is known at the time that the trade is put on. Once the valuation gap that the arbitrage seeks to exploit is closed, there is no incremental return to be had from holding onto the positions that constitute the strategy; while occasionally such trades overshoot in the snap back to “fair value,” this is neither something to be relied upon nor a source of much potential return, because the new value discrepancy that results will itself be arbitrated away. Once the point of “fair value” has been reached, the trade reverts to the market correlations of its components (if it is an imperfect arbitrage) and may begin to lose money due to the negative cash flow from financing the short sale. When full convergence is reached, the trade offers only interest expenses and the risk that the valuation gap will re-open. While the time that it will take for a valuation discrepancy to close is in many cases unpredictable, the time that an arbitrageur can wait for that to occur is known at the time the trade is put on, as it is a function of the potential return and the cost of financing the position.

In so-called riskless arbitrages,<sup>2</sup> the link between the instruments traded is systematic. Commodities and cross-listed equities offer riskless opportunities for locational arbitrage because they are fungible—gold is gold is gold, regardless of whether it is traded on the New York Mercantile Exchange or the London Metals Exchange, and American Depositary Receipts are nothing other than receipts for the underlying equity traded on a non-U.S. exchange. Derivatives and American Depositary Receipts offer riskless arbitrages with their underlying because they convert into them. Barring a major dislocation, such as the failure of a central counterparty or depository, the correlation between the value of a derivative and its underlying is fixed at identity (1.0000 or,

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2. There is no such thing as a riskless trade. These arbitrages earn that description because there is essentially no risk that the trade’s return driver—the correlation between the two assets—will fail the trader. In fact, these trades carry significant risk, but it is operational rather than economic. What keeps such arbitrageurs awake at night is worry about the failure of one leg of their trade: if one of their orders is not filled or is only partially filled, they find themselves with naked and highly leveraged directional exposure. If trade reporting is slow, or if the liquidity needed to reverse their trade(s) has meanwhile disappeared, they will be in this unhappy condition far longer than they would like to be.

where the derivative and its underlying counter-correlate,  $-1.0000$ ). As would be expected from their description as “riskless,” these trades offer low returns and are generally not worth pursuing unless they can be very substantially leveraged. Consequently, participation in these trades is largely restricted to firms with exchange memberships. Their minimal transaction costs and access to abundant and cheap clearing credit make the trades attractive for these firms to pursue although they generate returns of only pennies on tens of thousands of dollars of capital committed.

Merger arbitrage is often called risk arbitrage because the counter-correlations it exploits are neither fixed nor as low as  $-1.0000$ . By bidding for the target, an acquirer establishes a relationship based on fungibility between its share price<sup>3</sup> and that of its target, which is defined by the terms of its bid. The arbitrage opportunity the acquirer thus creates has the risk that the assets will not remain complementary—that the proposed merger will collapse and the counter-correlation between the bidder’s share price and the position in the target’s share price created by the merger announcement will disappear. Over the course of the acquisition process, the price divergence will narrow or widen depending on the market’s perception of the likelihood and timing of completion or the possibility that the acquirer will have to increase its bid. Not surprisingly, merger arbitrageurs tend to be connoisseurs of competition regulation and other noninvestment disciplines that can determine the success or failure of a proposed acquisition, as these are among the causes of the less-than-perfect counter-correlation that is the source of their risk and their returns.

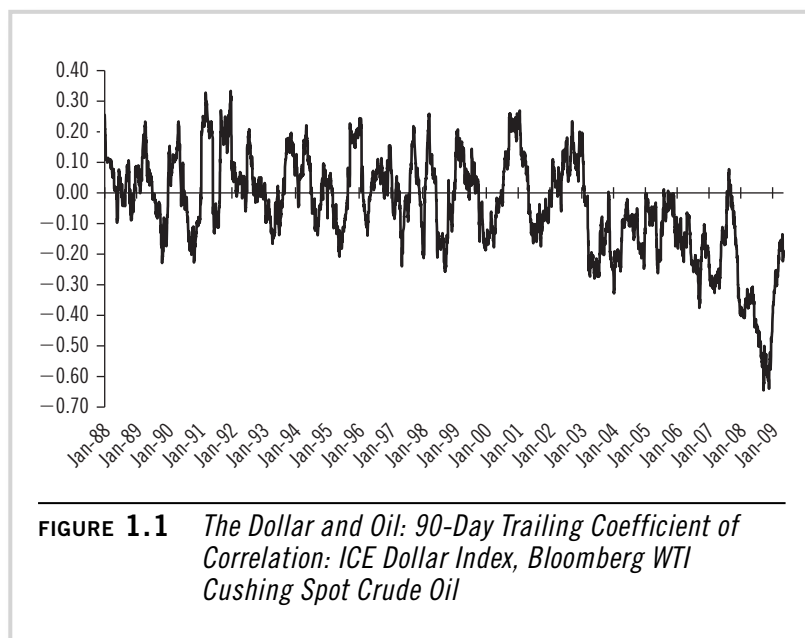
Statistical arbitrages<sup>4</sup> rely on observed correlations between different assets, for which the link is neither systematic nor artificially created through merger activity. In the summer of 2008, just about everyone believed that oil and the U.S. dollar exchange rate counter-correlate.

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3. “Classic” merger arbitrage is a pair trade between the equities of the bidder and its target, but if the target carries a lower credit rating than the bidder, or if completion of the transaction will result in a downward revision of the credit rating on the target’s debt, an arbitrage between their publicly traded debt may also open up, and there are investors who exploit such opportunities.

4. Confusingly, this term is also used for a pair-trading technique employing only roughly correlated equities, primarily practiced by investment banks’ trading desks (see Bookstaber (2007), p. 184 and following). It is also sometimes used to describe market-neutral strategies. In these cases, the trade is more properly regarded as a hedged transaction than a true arbitrage. Chapter 2 will discuss this rather fine distinction.

It was such generally received wisdom that one of that year's presidential candidates mentioned it as though it were a matter of fixed economic truth. This is the type of relationship that a statistical arbitrageur exploits. But the history of the relationship between oil and the dollar, as illustrated in **Figure 1.1**, indicates that the price correlation between them has been quite unstable and often not very significant. Although the aggregate statistic for the period shown there, at  $-0.0603$ , indicates marginal counter-correlation, it is hardly of very great significance. Their correlation reached a negative extreme in the third quarter of 2008, but it recovered sharply from there to the bottom of its apparently normal range. It remains to be seen whether it has permanently readjusted or will return to the range it has historically occupied. Statistical arbitrage entails the risk that the correlations it seeks to exploit could, as this one may, turn out to be transitory or even specious. Figure 1.1 shows that even well-established relationships between price series are subject to dramatic change, indicating that this risk is always present where causation cannot be conclusively demonstrated. Arguably, extremely high oil prices *do* have a causal relationship with the dollar's value, but that cannot explain the continued strength of the counter-correlation between them after oil prices began to drop sharply in July, 2008. Correlation is easy to data-mine, but not always easy to explain.



The risk to arbitrage strategies is precisely this sort of reversal—that the correlation upon which the trade relies for its returns fails to persist for the life of the trade. Arbitrages are regarded as riskless when this cannot happen for economic reasons and the only danger that the riskless relationship could break down is due to the irreducible risk of systemic failure of some sort. In merger arbitrage, correlation failure occurs when a deal collapses, for instance, because the acquirer’s or target’s shareholders successfully oppose it. In statistical arbitrage, correlation failure may happen for any number of reasons, not the least of which is that the correlation may have been a specious artifact of data-mining in the first place—an accident of statistics—rather than a relationship grounded in economic reality. As with cash flow trades, when arbitrages collapse, they become unfortunate directional speculations, and because arbitrage is in almost all cases fairly highly leveraged, the results are often considerably worse than just “unfortunate.”

Academic discussions of finance make frequent reference to arbitrage, where it often serves as a sort of *deus ex machina* to save theory from inconvenient empirical observations. How often do we read that this or that counter-example derived from actual market behavior is “an anomaly that will be arbitrated away”? In fact, this never happens except by mistake. Arbitrage may reduce anomalies, but it cannot both make them completely disappear and still be a profitable activity. Arbitrageurs who close a valuation gap completely find themselves with positions that offer few attractions to other traders and can close out their positions only by giving up some of what they have gained. Arbitrageurs who intend to remain in business for any length of time always leave something on the table. Arbitrage is a commercial activity like any other, carried out for return-seeking purposes rather than to lend elegance to a theoretical model. If practitioners believe that the returns offered by a potential arbitrage trade are inadequate, the trade will not get done, even if theory demands it. This accounts for the stubborn persistence of pricing anomalies that academics contend that arbitrageurs should eliminate, as I will discuss below.

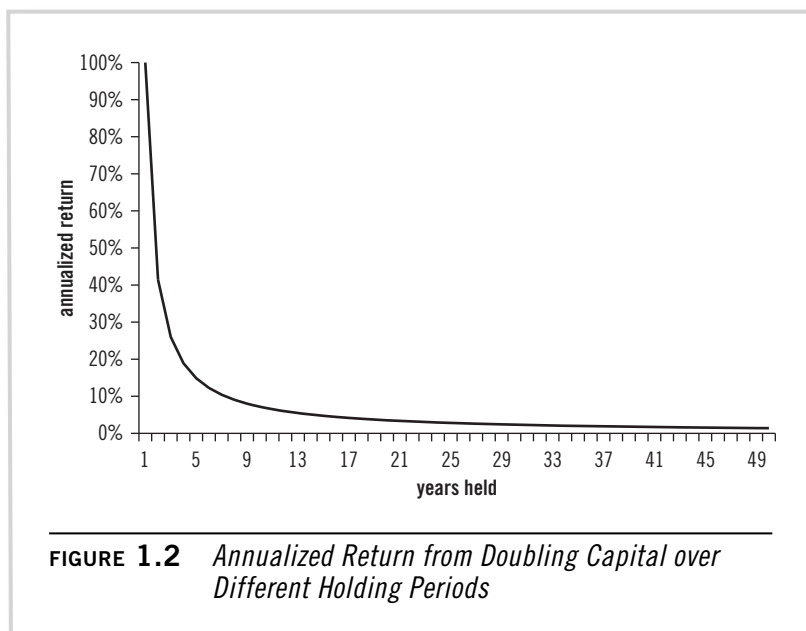
## Time, Return, and Risk

Returns are measured over time. If someone offers to double our money, before jumping at the chance we should ask, “Over what period?” If the answer is a day, then the return on the investment would be so extraordinary— $3.76 \times 10^{109}\%$  over a 365-day year—that we should immediately be suspicious and probably should call the police. If the answer

is fifty years, we can ignore the offer: during our lifetimes, a 1.4 percent *per annum* return has not been much to get very excited about.

Investors with actuarial issues, such as pension funds, must be able to estimate returns in order to determine their future funding requirements. If they invest in private equity (as many of them do), this presents them with some significant challenges. Internal rates of return are freely bandied about by private equity firms, but in instruments with lives of ten years or more, their value as an investment metric is questionable. A high internal rate of return achieved from an investment held only briefly represents an enormous loss of opportunity for such a fund's Limited Partners. Examination of **Figure 1.2** indicates that a 20 percent return over ten years is much more attractive to long-term investors than a 100 percent return in one year, unless a new, high-return investment can reliably and immediately be found to replace the investment that was returned to them along with its 100 percent profit. Reinvestment risk and the costs of carrying out new manager searches are fairly certain to offset much of the good fortune of achieving an extraordinary return in the short - term.

The role of time as the denominator of returns affects all investments, and it is highly erosive, as anyone who is conversant with any form of discounting model is quite aware. Parts of the next chapter discuss ways

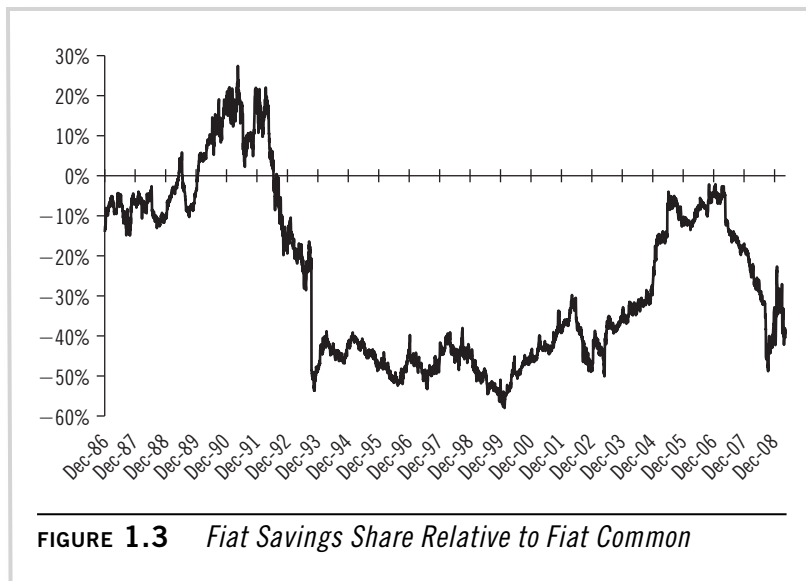




that investment managers attempt to reduce this denominator. The erosive effects of time are magnified for investments that are leveraged or when other forms of borrowing are involved, as in short selling. Financing costs compound, and over time they can erect a significant performance hurdle. For less rich trades, such as perfect arbitrages, they are often the primary determinant of whether the trade is worth pursuing at all. Long-term investments such as leveraged buyouts and leveraged real estate investment, which make substantial use of borrowed funds, rely on cash extraction from their assets, the tax efficiencies of debt and the limited partnership structure, and, ultimately, high exit multiples to overcome this hurdle. Long-term investors in these sorts of assets who do not foresee an exit as a contributor to their returns, such as the Mars or Grosvenor families, tend to leverage them much less highly than directional investors do.

At the extremes, investment time horizon dictates strategy. Over very short time horizons—the seconds or minutes over which some hedge funds and many CTAs operate—cash flow strategies are out of the question. If these traders receive a distribution or capture any positive roll yield, it is probably by accident rather than design. Over horizons of five years or more, receiving cash flows from the investment in the interim between purchase and liquidation is in most cases essential to the economics of the trade. In this respect as in many others, venture capital investing is the high-risk exception.

An anomaly that has attracted considerable comment and lured not a few investors into quixotic efforts to exploit it is the discount at which Italian savings shares trade relative to the common shares of the same issuer. This should be a riskless arbitrage, and an unusually rich and liquid one, that virtually cries out for exploitation. For 57 percent of the observations shown in **Figure 1.3**, the valuation gap between these instruments was greater than 20 percent, and at its richest it reached 58 percent. So the failure of arbitrageurs to trade it away is a major irritant to academics, who cannot tolerate anomalies unless they are small enough to be ascribed to market friction (that is, ignored). There is certainly market friction in this trade—Fiat's savings shares' daily liquidity averaged just 11.3 percent of that of its common shares for the period shown—but that is not sufficient to account for such an enormous and persistent premium in the common stock relative to the savings shares. However, it would be unfair to single out academics for criticism in this instance, since numerous practitioners, who ought to have foreseen the risk, have been enticed by its illusory attractions into what is, in fact, a classic value trap.



**FIGURE 1.3** *Fiat Savings Share Relative to Fiat Common*

Source: Bloomberg Finance L.P.

The problem with this trade is time. As there is no conversion feature attached to the savings shares, there is nothing to catalyze price convergence, as there is for derivative or merger arbitrage trades. Although Figure 1.3 clearly indicates that the prices of regular and savings shares *can* converge, there is no force acting on the shares' prices other than the activities of arbitrageurs themselves that would cause them to do so. Too aggressive an attempt to bring about convergence would (1) probably constitute illegal market manipulation, and (2) leave the arbitrageur with a position that would be impossible to unwind without giving back essentially all the gains achieved. The short leg of an arbitrage requires financing and consequently has negative cash flow that eats steadily into return until the trade is closed out, so holding onto the position indefinitely in the entirely understandable expectation that the valuation gap will one day close is not an economically viable option. Despite academic cheerleading and some not inconsiderable periods of profitability, putting on a convergence trade in Italian savings shares has mostly proven to be an excellent way to lose money.

There are other commercial aspects to the arbitrage business that academic research tends to neglect, including the costs of information gathering and the value of traders' time. For example, there are riskless arbitrage opportunities among cross-listings of shares on different exchanges. On exchanges where the cross-listing rarely trades, the

opportunities can sometimes be very rich, usually due to neglect on the part of the cross-listing's assigned market maker. But this does not happen often enough to make trolling through the price feeds from obscure exchanges a good use of traders' time, and obtaining the necessary price feeds is costly. Most of the time this sort of mispricing is likely to persist until the market makers notice and correct their error. Traders who engage in arbitrage of cross-listings restrict all but a very small fraction of their attention to liquid cross-listings that offer continual, but much less rich, opportunities to trade.

## Timing

Chapter 3 will discuss the relationship between volatility and compounding, which provides one of the foundations for portfolio theory by explaining why investors should shun volatility. But quite apart from holding periods, time enters into investment thinking in another very important way. The timing of a trade is not itself an investment strategy in the sense I have laid out, but it is a fundamental driver of the returns that most strategies will achieve. To paraphrase Gloucester in *King Lear*, "a trade may rot" if it remains unproductive for too long, to which Edgar replies, "Ripeness is all." Given the arithmetic of percentages, a trade that is perfectly timed will capture the maximum performance offered by the opportunity it is designed to exploit. This is obvious in the case of directional trades, but Figure 1.3 shows that it is equally true of arbitrages. Timing also affects cash flow strategies, but somewhat less markedly, because their returns are not entirely derived from the price movements that occur between purchase and sale. For cash flow investments where price and value are (or should be) identical, such as floating rate notes, timing risk is at a minimum, approaching but not quite reaching immateriality, because the rates offered by such instruments are reset periodically rather than adjusted continuously.

Time horizon does little to alter the importance of timing to returns—it is just as possible to make dreadful mistakes over ten years as it is over a period of as many seconds. Long-term directional investments that permit active management of the asset subsequent to its purchase (real estate, private equity, and a wide variety of real assets) allow their managers some opportunity to offset (or at least obfuscate) timing errors through improvements in cash flow generation and better timing at the exit. But their returns are ultimately no less affected by unfortunate transaction timing. The ability that active management offers to reduce the magnitude of these errors through postacquisition

management may in practice create considerable moral hazard, if it encourages investors to pay less than appropriate attention to considerations of value at the time of purchase.

Because timing can drive returns, it is a risk. While academics and practitioners have devoted an enormous amount of attention to risk reduction through diversification of positions, relatively little has been written about temporal diversification. Even time-honored practices such as bond laddering and dollar-cost averaging have received only modest amounts of formal analysis. A partial exception is offered by the private equity and venture area, where investors became acutely aware of the need for vintage diversification after the collapse of the Technology Bubble, and my discussions with people in the real estate industry suggest that vintage is becoming more of a concern to investors in that investment category, too.

But perhaps this neglect of temporal diversification is not really so surprising. Time is stubbornly resistant to analysis—as St. Augustine wrote, “If no one asks me, I know what time is. If someone asks, I know not.” At bottom, the result of what little thinking of which I am aware about the role of temporal risk in investing boils down to two frequently repeated cautions:

- ❑ Where investment is “lumpy”—that is, where large commitments are demanded over discrete time periods, as in private equity—it should be made according to a schedule. This will generally involve continuously repeated periodic commitments to diversify exposure to the market conditions prevailing at any given time of entry or exit; and
- ❑ Avoid market-timing: rather than complete exit from a market segment that is out of favor, investors should maintain some level of residual exposure to capture the maximum return from that segment, if there is any reason to believe that it will eventually recover. In keeping with this maxim, formal limits on minimum sectoral exposure are a common risk-management tool in conventional equity and fixed income investment.

Neither piece of advice embodies any extraordinary investment insight, and in fact closer analysis shows that they are essentially the same piece of advice and that they represent two sides of the familiar justifications for dollar-cost averaging. But it is hardly news that these admonitions are regularly, even routinely ignored. Private equity and venture firms despair over the failure of investment policymakers to

adopt (and stick with) disciplined plans of vintage diversification, while the constant temptation to override minimum exposure levels is familiar to every manager that operates within such constraints.

Hedge funds, CTAs, and a vocal minority of conventional managers glory in their refusal to hug benchmarks—a freedom that renders it impossible for them to set minimum exposure limits. They argue that, because timing imposes risk it offers returns: the risk should not be avoided if it can be exploited successfully. And the risk is worth taking because the arithmetic of percentages offers the largest slice of the performance pie to those who enter a trade at precisely the right moment. But there is the rub: exploiting timing on a consistent basis is very difficult to do, and timing errors can be extremely costly. Many of the most successful market-timers use technical and momentum indicators, often embodied in trading algorithms and implemented by computers, to avoid the entry of cognitive biases into timing-related transaction decisions. Chapters 8, 16, and 18 will discuss related matters in more detail.

Effective or not, market-timers pose an enormous quandary for those who must determine investment policy. While slavish attention to “Style Box” categories attracts ample criticism, such slavishness at least helps organize and limit an investment committee’s task. And it offers not unreasonable assurance of some level of performance consistency within any segment of the Box. Managers who flout its disciplines are difficult for investment policymakers to incorporate into their thinking. They are idiosyncratic and neither amenable to analysis as a group nor easily placed in the context of more disciplined (the managers themselves would argue, “blinker”) approaches to investing even in the same asset class. The difficulties of deciding whether and where in a portfolio to place these vehicles and those of other practitioners of investment techniques that depend on timing, recur throughout this volume.

