CHAPTER 1

Risk Uncorrelated with Returns

In 1992, the *New York Times* noted a current *Journal of Finance* article, "Market Place; A Study Shakes Confidence in the Volatile-Stock Theory."[1] This was highly unusual, as the *Journal of Finance* is the premier academic finance journal in the world and deals with very abstract issues, but this was a highly unusual article. Prominent researchers Eugene Fama and Kenneth French had published a paper on the signature theory in empirical finance, the Capital Asset Pricing Model (CAPM).[2] It documented that the main empirical implication of that model, namely that *beta* was positively related to stock returns, was untrue. A stock's *beta* is a measure of its relative covariance with the aggregate market, and was theoretically positively related to returns: higher betas imply higher returns, on average. Fama and French documented that beta's relation to returns was flat if not slightly negative, with high beta stocks producing no greater return than low beta stocks. It was as if Richard Dawkins wrote an article saying there is no empirical support for evolution. In 1973, Eugene Fama wrote one of the earliest and most widely cited papers supporting the CAPM, and nothing is more convincing, more necessary, perhaps, than that one of the priests had turned against the official religion. It was to be one of the most heavily cited *Journal of Finance* articles in its history. The basic model of risk and return that academics had taught for decades was shown to be empirically useless.

This finding of Fama and French, corroborated in many subsequent studies, is an example of the "omitted variables bias." Across the universe of stocks, which includes many small stocks that are hardly tradable, you see a positive relation between beta and return. But within a size grouping, say $1 to $2 billion in market capitalization, you would get the same, if not lower, return for having a high beta portfolio as you would with a low beta portfolio. The overall finding that beta was correlated with returns was totally due to the correlation between beta and size, not between beta and returns. It was as if someone noted the fact that people with longer hair were shorter than people with short hair, but this finding was merely due

to ignoring the more fundamental variable, gender: the fact that women are shorter than men, and many women wear their hair longer than men do. The correlation between hair and height, when one controlled for gender, was zero, and reflected the deeper, true relationship between the variables. A similar complication was occurring between return (height), beta (hair length), and size (gender).

Economists assume that risk begets return, in the sense that risk is the price one must pay to get a higher-than-average expected return. The implication is profound, if limiting: Your investment success is solely based on whether you can tolerate risk, and dumb luck. You may be tricky at finding higher returns, but you always get only as much as implied by the risk, so when we see alpha, it is mainly sheer luck or survivorship bias. When this theory was created in the 1950s and 1960s, the profession's thought leaders pretty much assumed that the empirical corroboration would be easy. A correct theory's best friend is data, but the data have been very unkind, not just to their original financial model of risk and return (the Capital Asset Pricing Model, or CAPM), but any model purporting to capture the risk premium. When we look at risk and try to measure it directly, it is generally uncorrelated with average returns. The contrast between theory and practice is illustrated in Figure 1.1. The little dots represent observations, which are noisy estimates of reality. If you draw a line through them, on average, that line should slope upward, so that the average return is positively correlated with risk (the black dots). We see instead a bunch of dots in a cloud that, if anything, slopes downward (the white dots). Curious. A theory should *usually* work, at least approximately. If it almost always does not work, a good scientist should reject it—data are the ultimate judge of theory.

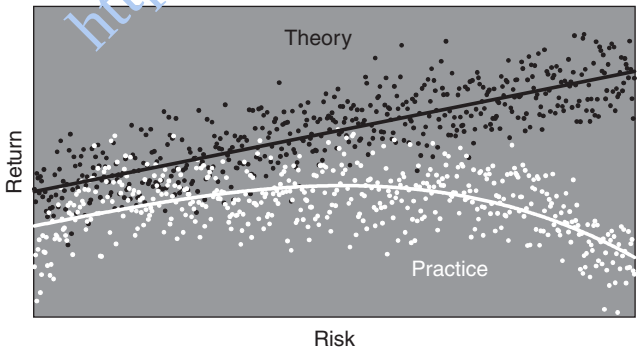

FIGURE 1.1 Risk and Return in Theory and Practice

As measures of risk are only rarely positively correlated with average returns, earnest attempts to find alpha through modern financial theory are snipe hunts, predicated on something that does not exist. However, if we accept that the empirical data on risk and return is not anomalous, but reflects an equilibrium when people are better described as envious as opposed to greedy, attempts to find alpha can be much more productive. As risk does not beget return on average, there are some strategies implied that are as obvious as the move from active mutual funds to index funds, yet offer significantly higher Sharpe ratios. Furthermore, while some alpha seeking is based on understanding portfolio theory, most of it is not. Lastly, alpha is basically private information about straightforward but detailed situations, which implies that people have a good reason to present it strategically.

The theory that risk underlies any returns not due to chance is fundamental to modern finance, and because it is also wrong presents both current confusion and considerable opportunities to those seeking alpha. The key is that risk taking and risk tolerance is not like physical courage, the ability to withstand a physical pain, but rather like intellectual courage, the ability to withstand ridicule. Physical courage is something most people agree on, and invites empathy, as when we cringe when watching someone crash his bike. In contrast, intellectual courage as it is sometimes practiced is usually seen as foolishness because risk is a deviation from what everyone else—the wisdom of crowds, the vast majority of smart people—is doing, and invites ridicule that is pointed and very hurtful.

Risk taking in financial markets is much more like intellectual risk taking than physical risk taking, though the foundations of current models are predicated on a "physical risk" premise, as when Keynes compared the risk premium to a compensation for working in a "smelly" environment. In that view, one who takes higher, nondiversifiable risk is something intuitively onerous to all but sociopaths, and indeed risk's universal recognition at some level is necessary for it to theoretically generate a return premium. Empirically, however, taking more of this kind of risk actually generates a lower return within equities, and in general, people who put a disproportionate amount of their wealth into the stock market, or take all their wealth out of the stock market, are taking similar risks, and are generally regarded as bizarre, not brave. Thus, standard models are profoundly misleading because they mischaracterize what risk taking feels like, and what to expect from taking it.

Only in the context of a life's strategy, of taking risks to discover about oneself, to invest time and effort to learn more about a very parochial problem carefully matched with one's talents, does risk taking reveal itself as a superior strategy. A good risky investment is tied to one's human capital,

meaning it is highly idiosyncratic, not so much dependent on covariances with the business cycle as with one's talents.

THE RESPONSE: RETURN (RISK (RETURN))

The response of the academy was like a socialist hearing about the failure of the Soviet Union and saying that the Soviet Union was hardly a socialist state. Fama and French said that beta, the traditional sufficient measure of risk, was merely incomplete. If one looked at the things that did appear correlated with returns, *size* (that small cap firms outperform large cap firms) and *value* (low price/earnings aka P/E companies outperform high P/E companies), these were actually risk factors. Like dark matter in the universe, we don't see it directly but we do see its effects and infer it must be there because of those effects. The high returns on some characteristics must imply risk, and these are our new risk factors, which are really proxies for the risks they represent. Furthermore, they were not going to replace beta with proxies for size and value, but add proxies for size and value to the model. Size and value weren't bugs, but features of their interpretation of the risk-return theory. Fama and French proposed a new three-factor model that included variables for size, value, and beta in an attempt to save the standard theory.

Economics is the king of social sciences, but that's faint praise. In the heady 1970s, there was a consensus that economists were Worldly Philosophers, and knew what made some countries rich, as well as how to forecast if not avoid recessions.[3] Chastened, economists now focus their laser logic on why it's optimal to peel a banana from the other end (as monkeys do), why people pay too much for gym memberships they don't use, or why sumo wrestlers cheat.[4] They may not be big questions, but at least you can answer them correctly, and a right answer to a small question is better than no answer to a big question. Asset pricing related to risk, alas, is more like business cycles than peeling a banana.

Current asset pricing theory with respect to risk and return is not really a theory, but a framework. A theory is a specific testable idea, whereas a framework is a set of properties a theory must have, but still allows many, possibly infinite, expressions. An intuitive idea that has elegance, consistency, and can be mathematically elaborated becomes awesomely alluring when there are no data, sufficiently complex so that when the data start coming hard and fast, the framework is ready to handle it. The framework is nonfalsifiable because any test is not of the framework, but merely a specific theory that the framework allows.

There is no consensus on how to measure risk, and the leading candidates at any point in time are parochial, inconsistent, and changing. Originally, it was volatility, then covariance with the market, then covariance with several macroeconomic variables, and now it's a covariance against something called a *stochastic discount factor*. As Nobel laureate Robert C. Merton said about economics, "Risk is not an add-on.... It permeates the whole body of thought."[5] Indeed it does; risk is everywhere in economics as an explanation, but not as something directly measurable, at least in regard to risk relevant to expected return premiums. Risk is the economic equivalence of the ether, a substance that nineteenth-century scientists thought permeated the universe and explained how electromagnetic and gravitational forces moved through space. As no one could ever find it, however, more and more complex reasons were given as to why we could not measure it (for example, it carried a little turbulence with the mass) until Einstein created a model that did not need it. Risk is to finance what ether was to nineteenth-century physics.

But even if we can't measure risk directly, there is One True Thing about risk according to financial economists: it is positively related to expected returns. Thus, we can always work backward, find something with high returns, and say there must be a lot of risk. Even behavioral economists, who argue that many things are the result of systematic biases in human heuristics, admit that risk explains a lot, just not, say, the value effect. The problem is: the things that correlate with returns, the potential proxies for risk, tend to be parochial, inconsistent, and changing.

When risk appears to work, it is always inconsistently applied. The same equity risk that is used to explain why the stock market has higher returns than bonds is for some reason inversely correlated with returns when applied *within* equities. The same interest rate risk that is used to explain why three-year bonds have higher returns than the less volatile three-month Treasury bills is not relevant when extrapolated to the more volatile 30-year bond, where there is no further return premium. The same distress risk that explains the difference between AAA (safe) bonds and BBB (less safe) bond returns, is somehow not relevant when extrapolated to B (really unsafe) bonds. For a while, bankruptcy risk was thought by many to explain the high returns, and thus risk, of value and small cap stocks, yet when measured directly, high probability of default companies were found to have lower equity returns than low default companies. Banks, equity options, junk bonds, bankrupt bonds, mutual funds, commodities, small business owners, movies, lottery tickets, and horse races, have all failed to show any positive risk-return pattern—unless one defines risk as that which is reflected by assets with high returns.

FAILED PARADIGMS

The Ptolemaic system was a classic paradigm that seemed to explain the motions of the heavens. The basic model was that the moon, sun, and stars were affixed to spheres of various diameters, all with the earth at its center. Little spheres, called epicycles, were added to the sphere surface to allow the model to capture more complex movements, as when Venus appears to slow down, stop, and move backward in an otherwise circular path around the earth. As more observations came in and the model grew in complexity, we discovered that if we put the sun at the center and replace circles with parabolas, all those little epicycles are no longer needed. The truth is simpler than its alternatives because an incorrect theory has to add epicycles to rationalize its anomalies, and a good judge of theory is its coherence: does it need "lots" of epicycles? It seems so obvious now, but then, the jury-rigged Ptolemaic system worked pretty well in explaining the data because it was fit to the data, and further, the idea that the earth was stationary was a seemingly self-evident assumption. And so it is with our current theory on risk and return.

Academics have been studying risk for decades, and assert regular investors all price it consistently across various asset classes, yet have not been able to identify this risk factor to first order approximation. Perceiving risk must presumably be like our ability to distinguish dogs from cats, something we take for granted, yet a task too difficult for any machine using Artificial Intelligence.[6] Furthermore, most investors behave nothing like the theory implies—trading frequently, massively undiversified—but this inconsistency is supposedly inconsequential. This book documents the scope of the risk-premium failure, and what this means for the 99 percent of market participants who ignore efficient markets theory and try to find alpha anyway. Alpha seeking in financial markets is based on a risk taking rule that is good generally, but in highly competitive asset markets more like gambling than investing.

Any metric of risk used to explain one fact is inconsistent with a million other facts, and so if the higher return on the equity market is due to a risk premium, this implies that little gremlins of some other risk are then inversely correlated with the correlation between individual equities and the market as a whole, a sort of equity risk karma. So, going long the market *seems* to generate a 6 percent risk premium (return above the risk-free return on U.S. Treasuries), while going long a 1.75 beta asset and short a 0.75 beta asset—generating a zero-cost market return (that is, Beta = 1)—generates a *negative* return. A clever person can think of a neat story about why this is so, but then, the Arbitrage Pricing Theory that motivates so many factor models is built off the feasibility, nay, the active implementation, of

such arbitrage on equivalent portfolios. As the anomalies have proliferated, the analogy of adding epicycles is not dramatic license. Such complexity is excusable, even attractive, if one thinks that reality is, in fact, complicated, and these models generate value to those willing to invest the time in gaining understanding of complex theories, but at some point you come up with so many auxiliary patches that the theory collapses under its own weight.

Though economists admit the CAPM or volatility is not a useful measure of risk, they have not removed it from its prominence in introducing the concept of risk and return to students. Risk is supposedly a variation on these themes, a technical detail about to be discovered that will appear as an extension to volatility or beta (which is from the CAPM). Academics who study the issue can't agree, or measure, risk to a first approximation, and prominent practitioners define it idiosyncratically: volatility, beta, correlations with inflation, yield curve slope, consumption, or exchange rates. Nonetheless, the great unwashed supposedly agree sufficiently to affect the price of things based on a conception we can't measure or model.

From a tautological perspective, volatility and return are correlated. But strictly speaking, that is the relationship between maximal returns and volatility, not expected or average returns and volatility. A highly volatile asset, like a lotto ticket, has an insanely large top return, and so to achieve such a return one must have made a highly risky bet. But generally economists are not interested in the possible, but the average, and so the degree to which volatility and *average* returns correlate is the subject of interest. Saying to get a high return, you have to take risk, or that if you take high risk, you could get a high return, is very different from saying that you should expect a higher return for taking more risk. The term *risk* is also confusing because in many cases a return is like a stated yield on a bond—it pertains to the best case or most probable scenario. As some bonds default, a stated yield and an actual yield differ by the effects of the defaults, which are usually concentrated in time around recessions. Thus when someone says a bond with a 15 percent yield has high risk, this is because we know that on average the return will certainly be much lower, as the default risks materialize and chip away at this stated return. But that is all merely amortizing expected defaults over the life of a security. The more fundamental issue is that no one has found a formulation of risk that explains the various *average* returns, the returns we expect to get over the cycle of good and bad times on a variety of investments. That is, risk as a premium for the discomfort it causes, not like the depreciation against stated yield due to random but statistically certain losses.

In contrast to the immeasurability of risk, consider physical beauty, a characteristic similar to risk in that you can rank it. Beauty is based on our preferences. Indeed, at first glance, beauty is *more* subjective than risk (no one sees a bunch of equations in *People*'s annual "Most Beautiful" issues).

Yet empirically, beauty is much easier to define than risk. Most everyone thinks that Jessica Alba and George Clooney are physically attractive. Identifying physically unattractive people is also easily agreed upon (overweight, bad skin, asymmetric facial features). In contrast, if *Forbes* had to put a list of 10 risky companies on its cover, it would not be obvious at all, because volatility and beta are actually *inversely* correlated with returns when you control for size. What does one choose? Value companies? Value companies are not risky in any obvious way, relative to growth companies, which, at high P/E multiples and higher volatility fit the more intuitive description of risky. Distressed companies? In fact, distressed companies have poor returns, so in the risk-return framework such deathbed companies have some strange low-risk characteristic. Some assets, like short term U.S. Treasuries, or AAA bonds, have very low returns, and are intuitively not risky: low volatility, correlation with the market, the business cycle, yet these characteristics do not generalize along the yield curve or within corporate returns. In ranking things from highest to lowest, why should identifying risk be infinitely more difficult than identifying beauty? One thing finance never mentioned in the early advanced textbooks on asset pricing, because they never expected this problem, is that risk as a practical matter is insanely subtle.

It is often amusing to consider how our scientific ancestors' quaint beliefs that we now know, with hindsight, are absurd, such as geocentrism, or that heavy objects fall faster than light objects. But consider the following ideas: eating fats as opposed to carbs cause obesity, steroids do not affect athletic performance, juvenile delinquents are lacking in self-esteem, stretching before an athletic performance makes you stronger, babies should sleep on their stomachs, or that primitive peoples are less violent than those in modern society. Each of these ideas was embraced by experts in their field and later found to be 180 degrees wrong, cases where the grandmother's common sense trumped her know-it-all Ph.D. grandson at Harvard. Theory is very powerful, and acts as a lens and a blinder; ultimately you can't see things right before your eyes. The more educated you are, the easier it is to confabulate an explanation for seemingly anomalous results. A step-by-step outline of the little evasions and selective omissions used in self-delusional good faith by smart, educated academics today is useful in understanding how flawed paradigms survive. Outsiders cannot judge these theories because of the jargon and specialized mathematics of this literature, other than to look at the general results.

This book tries to make a serious criticism and counterproposal to current financial theory on risk and return that is comprehensible to the average college-educated reader. Once one understands that risk-adjusting returns, in the sense of adjusting for a priced risk factor (as opposed to

amortizing infrequent defaults), is a red herring, one can search for alpha more productively.

YOU MINIMIZE SOME RISKS, PAY TO TAKE OTHERS

In general, volatility and things correlated with it (covariances, uncertainty) are uncorrelated with return. However, for the highest volatilities, there is a negative correlation, such as really volatile stocks that have lower-than-average returns, and for the lowest volatility assets such as cash, Aaa bonds and Treasuries also have lower-than-average returns. There appears to be a premium people pay to acquire "sure things," and, at the other end, to buy "hope."

The key false assumption in the standard risk-return theorem is that people are merely selfish. If people look at their own wealth, irrespective of others, and value the hundredth dollar less than their first dollar (declining marginal utility), you get an aversion to absolute wealth volatility that is like our aversion to smelliness. Thus, to the extent something is irreducibly volatile it must have a premium to persuade people to own this smelly stuff. In contrast, consider replacing this assumption with the assumption that people are fundamentally status seekers. Now we have a zero-sum game because status is about your rank, peers you benchmark against, and so minding to the market portfolio is risk-free because it keeps you in the same place, while taking any deviation from the market—too much or too little exposure to common factors—is risky. Merely by assuming people maximize their relative position as opposed to wealth, you get a different result, because a risk-free portfolio in a world of status seekers is different from a world of mere greed: one is doing nothing; the other is doing what everyone else is doing.

The absence of a general risk-return correlation is a non-obvious implication of this relative status assumption. In a rational equilibrium, if people care about their relative rather than absolute wealth, all risk becomes like diversifiable risk in the traditional CAPM, avoidable, and therefore unpriced. Risk taking is deviating from the consensus, the benchmark, and when you put disproportionate money on IBM, someone must be putting disproportionate money short on IBM—relative to the consensus. Such risk taking is predicated on alpha, and alpha is a zero-sum game. A zero-sum game is symmetrical, and therefore, implies that for every risk taker there is someone essentially taking the same amount of risk, just in the opposite direction, like when one is playing poker. If all risk is symmetrical, it must have the same expected return (both players can't have a positive expected return

when one player is betting against another), and so arbitrage sets the returns to everyone the same, and risk has no premium.

Risk, unfortunately, has two distinct meanings within economics, and economists often confuse them. In one, it is a measure of variance, or volatility, though you can make this as complex a distribution as you desire. If the expectation has a greater-than-zero variance, it is risky. To the extent we are talking about random draws from an opaque urn, investors, and everyone else, seek to minimize it. They also need to estimate it, knowing how bad things can get (Value-at-Risk), or the value of options that are highly nonlinear functions of the payouts and necessitate knowing the state space. The other definition of risk pertains to the specific type of covariance that is priced in asset markets, as say beta represents in the Capital Asset Pricing Model, and this is the risk that is currently a mystery.

When it is priced, however, usually standard theory has a sign error! We pay for hope and for certainty, two ends of the risk spectrum. Thus, with certainty we have things like cash, short-term U.S. Treasuries, and AAA securities, whereas for hope we have casting calls, high-flying stocks, out-of-the-money options. Both sets of assets have below-average returns and because the market cannot generate an endless supply of these assets, there are barriers to entry in generating certainty and hope. We pay to take risk allied with our dreams because dreams are an unappreciated part of our reality: much of our daily thought concerns dreams. We pay for our dreams, because a life without dreams is a definition of Hell ("Abandon All Hope, Ye Who Enter Here," in Dante's *Inferno*). Many bad investments cater to our hopes but are imprudent, because in practice there is not a fine line between healthy risk taking and gambling, and the noisier the data the less obvious risk is gambling.

There are situations where alpha exists like the archetypal arbitrage, but the emphasis should not be on the risk adjustment and portfolio mathematics, but rather the parochial details about a market niche that may allow one to confidently know that alpha is really there. No matter what your position, it helps to understand how the archetypal alpha is created, because a manager who knows the source of his organization's alpha is much more effective than one who merely knows everyone's name. Even if you are not a portfolio manager creating alpha, it is essential to understand the archetypal alpha you are selling, and how it relates to the market, customers, and employees. Meanwhile, risk does permeates our actions because we often make decisions that attempt to do something better, which is like being blindfolded in a labyrinth, moving forward based on a theory as to how that labyrinth was designed, but also corrected by occasionally smacking into walls. Learning by doing often leads one to drastically refocus one's tactics or objective, as one learns of more pressing, or more feasible solutions, as

those who went to California in 1849 to find gold, but then made their fortune selling shovels. Entrepreneurs, inventors, alpha seekers and others like them are trying to create value by doing something differently from how others would do it.

The goal in the search for alpha is to find what you are good at, become better at it, and do it a lot. Thus, it is more of a self-discovery process in a quest to find an edge that can become a vocation or firm value, rather than a specific trading strategy. Nothing will work for everyone, in the same way that not everyone is suited for a career in football, acting, or writing software. The value of knowing that taking a risk in almost any form is not generally rewarded is very useful, because you can then focus on what really matters, which is the expected value using a common discounting rate (for example, long-term LIBOR rates). Further, you can make sure your non-alpha investments are not in areas where investors are accepting lower-than-average return because it plays into their hopes. There is no return premium for doing something different without alpha, just as there is no return for taking systematic risk, because both risks are symmetric when people benchmark against others. If you don't understand alpha you are a sheep to be shorn, because the markets are like poker tables: They may not be efficient, but they are highly competitive.

Just as there are hundreds, if not thousands, of aspiring actors for every actor who makes a living acting, there are hundreds, if not thousands, of investors trying to be the next Warren Buffett, even though there are very few who can make the returns that compensate for the extra expense and idiosyncratic volatility entailed in trying to outwit the markets. But the key is not to stop dreaming, but to be sufficiently realistic to not take risk on the misplaced idea that any general sort of risk begets returns, and learn when to cut your losses, especially in areas that encourage the misconception that everyone has alpha in a certain domain. Knowing that you generally must *pay a premium to take risk* gives one a very different view on risk taking, because it is something you must economize on and think hard about, not something that will necessarily, on average, generate high returns. Indeed, thinking about risk as something that *necessarily* generates higher returns independent of our particular strengths leads inadvertently to gambling, a well-known investing vice. The larger-scale opportunity cost of not taking risk is even greater, though, which is why we do not mind flouting the poor average returns to financial risk taking, because we consider the broader context of intelligent risk taking in one's career.

When you know something important that's true, new, and important, the world makes more sense. Things that were previously unrelated anomalies now fit as part of a pattern, and so are easier to contemplate. For example, imagine your grandson, making the equivalent of $500K per

year in current dollars, feeling depressed about his lot in life because his neighbors all make $700K a year. It's hard to fathom, yet that is precisely our condition, as the average white collar wage is near $100K, about five times as much as our grandfathers' average income, and yet surveys show that there has been no similar upward trend in happiness during this massive prosperity. This is the Easterlin Paradox, where aggregate income appears to generate no commensurate increase in happiness after only $20K per year, which is a puzzle to those who presume that happiness is a function of wealth. If we assume people are benchmarking themselves against others, this makes sense, while if their utility were merely a function of absolute comfort, it makes no sense.

If people invest on hope, some based on a search for alpha, some merely dreams, we should see assets with the greatest upside (positive skew) with lower returns, and indeed, highly volatile assets with the greatest upside tend to have the lowest average returns. The massive underdiversification of most investor portfolios (for example, more than 50 percent of them contain fewer than three stocks), makes sense only if people perceive they can pick stocks with higher-than-average returns, consistent with the alpha presumption that accompanies actual risk taking. The statistical inefficiency of these picks makes sense to these undiversified investors because, in general, one can rationalize potential alpha insights for only a limited number of situations. This preference toward volatility is why the highest volatility stocks have the lowest returns of any stocks, because they are popular for those attempting to play their alpha, and this excess demand increases their prices and lowers the future returns.

You need to know less to understand more with a correct theory, because a theory reduces the degrees of freedom necessary to explain the world, sort of like if you know $y = x^2$, you only need to know x to know y, whereas if you mistakenly think $y = x^3$, you need a story for why this isn't so for every observation of x and y. Think about true believer socialists in the mid-1980s, coming up with ever more clever explanations as to why East Germany was really more advanced than West Germany if you look solely at the ball bearings industry, or has a freedom that is less alienated, or something equally too narrow to really be a true measure. Or perhaps we should look at Albania. No, Yugoslavia. No, and so on. An untrue model leads to theories becoming more complex as more data arrive, and the empirical analysis of the data becomes more complex as well. So we see more and more anomalies to the standard final model, which gets more and more complicated because it doesn't work.

There is nothing more devastating to an intellectual than to know that much of his life's work created, refined, or elaborated is a dead end, not just an honest mistake overcome by progress, like someone making vacuum

tubes shortly before silicon chips were developed, but someone working on phrenology, Marxism, or N-rays. Any serious thinker thinks about posterity, about becoming the father of some idea that is the foundation of other ideas, like the Double Helix of Watson and Crick fame, the Nash equilibrium, or the Black-Scholes options pricing model, ideas that seem to enter an *Ideas Hall of Fame,* forever esteemed by educated people. For an academic, it is the equivalent of heaven. The flip side, however, is just as strong. The thought that I am a sensible, competent person is inconsistent with the thought that I spent most of my creative energy supporting a theory that turned out to be worthless. Therefore, most intellectuals will distort their perception of the data in a tendentious direction, trying to not write off their past efforts as a sunken cost, usually by emphasizing not specific results, but the ability of the mathematical framework to accommodate the ultimate true model. Only when they die does the idea that in their youth they thought they would live forever die with them; the idea does not die first. The current experts of finance are almost surely smarter, know more math and statistics, and have examined more data, than you have. Yet they also strongly believe in something patently untenable, a strange example of when more expertise leads to a less accurate picture of the world.

Most top financial researchers see the current anomalies as just that, anomalies. Papers are presented each year, explaining how a novel conception of risk like the Fama and French three-factor model—that regular investors supposedly have applied all along—explains various anomalies, or suggest how potentially, extending the model by using facts such as non-normal distributions or parameter uncertainty, would be within-the-paradigm solutions. Statistician George E.P. Box famously said, "all models are wrong, but some are useful." The CAPM and its offshoots are not one of those useful models. It is not a useful approximation because it, as an approximation, has a sign error. It prioritizes estimating a risk discount factor, even though the collective effort after 40 years of finance professors has not generated successful models. Lastly, the current proponents of various tweaks from behavioral finance, tail risk, or downside risk do not appear to realize these refinements have been around since the inception of the status quo 50 years ago, and the lack of success of these new ideas is that they have never worked, not because they have not been tried.

Strangely, it is more useful to know that the risk-return theory is generally not true, than if it was true. If it were true, the only practical implication is to be diversified, the rest, a matter of preference along the risk-return tradeoff that is fair and set by the market. You always get what you pay for. If it is generally not true, the key question is, can you trade your jealousy for greed, and then choose a low absolute risk, higher relative risk portfolio that will significantly increase your wealth? If you merely wish to maximize

your Sharpe ratio relative to the passive indexes, if you are willing to benchmark performance against the risk-free rate as opposed to the market, this is straightforward. As people generally overpay for hope, position one's portfolio to sell it. Generally, do not invest based on scenarios of massive success because on average these are bad investments; to the extent risk taking on average works, it is allied with highly specific wisdom and effort, so passive attempts to achieve your dreams are usually just lottery tickets.

It is also important to understand that, in general, alpha is concealed and distorted because it is valuable and so easy to copy. Suppose you discovered the momentum effect in 1980, something that is simple enough to understand, but was not well known at the time. How would you get access if you had no capital, and no contacts? What would say to your new partner that would be sufficiently convincing, yet not reveal your secret? On the other side, you have multitudes who want access to your capital and no objective way to judge their potential success. How do you choose among them given that they cannot prove they are valuable before actually letting them have access to your resources? How do you split proceeds? It is thus very important to understand the common activities in finance, the subterfuge, the negotiations, and the parochial situational knowledge, because these issues are endemic to alpha searchers. People invariably look at their own situation and think it is unusually unsophisticated, petty, and political, but that is the result of a world where alpha is so often misrepresented.

This book tells the story of risk from its beginnings to its current miasma, where risk now is evidenced by return as opposed to vice versa. After more than 40 years, one wonders how completely the existing paradigm must fail to generate more than a refinement to the market portfolio proxy. This book argues for replacing the old assumptions with new ones, primarily replacing greed with envy in utility functions, and, like derivative pricing, concentrate on the expected return and forget about the discounting. Finding alpha is about finding attractive expected returns, and this means exploiting one's comparative advantage, protecting, and understanding the politics inevitable when valuable ideas have little marginal cost.