CHAPTER 1

Investment Ideas

Evolution or Revolution?

The universe of investment opportunities can seem infinite. For most investors, modern investment is a complex minefield of multiple assets, multiple products, and multiple means of investment. Added to this mix are the vast numbers of firms competing for an investor's money and the myriad ''stories'' developed to provide credence to their particular approach.

On the surface, it would appear that modern investment should be a relatively straightforward exercise. At its essence, the process should entail (1) selecting securities that are expected to outperform other securities in an asset class, (2) selecting a group of asset classes that will outperform other asset classes, and (3) deciding on the allocations among asset classes and securities that meet an investor's risk tolerance. Beneath the surface calm of this investment process, however, lie riptides of incomplete information, changing expectations and circumstances, and evolving interrelationships. This state of flux exists both with the investor and the market (the composite investor). An investor's tolerance for or understanding of risks changes over time, as does his or her investment horizon and view of the future. The market's tolerance for an estimate of risks also changes over time, if for no other reason than the sources of returns and risk profiles of differing assets are not static. They change with new information, new interrelationships with the economy and other asset classes, and new modes of product delivery. Thus, it is not surprising that a vast asset management industry has grown to meet these changing expectations and processes.

The asset management industry is not monolithic. It consists of investment managers, marketers, consultants, accountants, lawyers, television or Internet personalities, journalists, and, of course, the pundit of the day. With so many sources of information and versions of the truth, the question is and remains, who is an investor to trust? In Lewis Carroll's *Alice in Wonderland*, Alice asks the Cheshire Cat which path she should take, and

the cat answers by saying, "That depends a good deal on where you want to get to." Alice answers that she does not know, at which the cat answers, "Then it doesn't matter which way you go." Most investors share this hidden angst, wanting to reach an end that seems so reasonable yet defies specific definition. In short, all investors really want is a simple answer to the basic question, What do I invest in to make as much money as possible with as little risk as possible?

This chapter provides a brief history of how major advances in financial theory and investment practice have attempted to reduce the infinite opportunities of the marketplace into a manageable subset of investable choices and, in so doing, answer the question of how an investor can make as much money as possible with as little risk as possible. The chapter shows how investment processes and attitudes toward those processes have evolved to meet ever-increasing changes in the economy, regulations, and technological advancements. It offers a review of the range of current and past efforts to understand and rationalize the process of security selection, risk management, and asset allocation. We mentioned earlier that investment managers have a story. We, too, have a story. Throughout this chapter and the course of the book, we explore the premise that investing always entails known and unknown risks, and that, irrespective of its source, investors must always aggressively question information and the due diligence of others. For example, the first questions an investor should ask about a product are when will it make money and when will it lose money. Surprisingly, far too often the individual selling or advising on the product either does not know or refuses to discuss the potential risks of investing alongside the potential benefits.

In this vein, perhaps one of the greatest myths and misconceptions of the investment management industry is that an investor can fully rely on the advice and recommendations of professionals. In truth, not all professionals are professional, and even those who are, sometimes lack the resources or understanding to fully educate their audience. For the most part, these industry professionals are charged with selling a number of different ideas or products and may have limited knowledge, limited experiences, and conflicts of interest—all of which require intense examination prior to any reliance on their recommendations. The true professionals in this area have a striking willingness to investigate. When the right questions are asked, it is not unusual for these professionals to learn the particulars of an investment or investment process along with their clients. Investors should take advantage of the absolute, or comparative, advantage of these skilled professionals and try to avoid the others. How to distinguish between the two is difficult. Investors should understand the world in which these professionals exist

and try to determine if an advisor has adequate knowledge and limited conflicts of interest.

As mentioned in the introduction, the authors have had a long history in the field, as both academics and practitioners. On average, we began our careers about 30 years ago. When we started, options and futures were more myth than substance, and private equity, hedge funds, and real estate investment products were still the domain of the privileged. What we did have were a few guiding principles of how to invest. Among those principles, we were taught that unless absolutely necessary, never give up complete control of the investment decision to others, and always know when an asset should either make money or lose money. These two principles have held up well over the years, especially in markets where the failure of bond ratings and the failure of multi-asset diversification have greatly tested investor reliance on investment professionals. A third principle, despite or perhaps because of the recent failure of investment advice, has singularly withstood a changing and complex world. That third principle is this: In the end, investors are and must be responsible for their own investment decisions. This is not to say that an investor should not look to the advice of others, only that it is imperative to seek transparent and objective validation of all advice.

The synopsis of our experiences is that in this modern world of investment, change is a constant, adaptation a necessity, and due diligence a given. This view has led the authors to seek transparency in, and an understanding of, the sources of returns of various asset classes and investment products and to objectively test both the implementation and the boundaries of professional investors' recommendations.

Given the changing dynamics of modern capital markets, much of modern investment is centered on the methods employed to estimate what may happen and alternative approaches to managing the risks surrounding these events. Our central thesis is that expected return is a function of the risks taken within any endeavor and that those risks may not be able to be measured or managed solely through complex systematic quantitative models. Thus, modern investment must focus on a broader context, including the benefit of an individual's discretionary oversight, and each investor is responsible for accepting the upside potential of an asset as well as its downside.

The story of the evolution of our understanding of that return-to-risk trade-off is one of the underlying themes of this book. The ''evolution'' part must be emphasized, as the expected return-to-risk relationship changes with new information. Exhibit 1.1 offers a summary of some of the major advancements in investment management over the past 60 years. Most of these advancements are in the areas of how we value investments and how

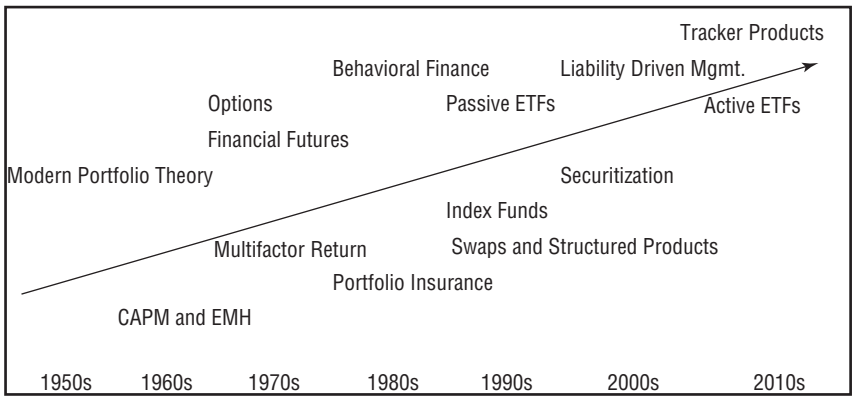

EXHIBIT 1.1 Evolution of Asset Management

new investment alternatives were created. We can only hypothesize what changes will happen in the future: but happen, they will.

Much of what we do in investment management is based on understanding the trade-offs between the risks and returns of various investable assets, as well as understanding various aspects of the asset allocation process, including alternative approaches to return estimation and risk management. These trade-offs are often conditioned by a belief system built within a historical context. Behavioral science has shown that most people have a great deal of difficulty moving beyond what has once been tested and learned. However, the world does change. Over time and as additional information is received, we learn that risk and its measurement are current snapshots rather than the never-changing map we once thought. Collectively, those snapshots describe a road that is bumpy at times but nevertheless reveals changing ideas and processes and enables an investor to find a workable solution. In this regard, there are no optimal solutions and no easy paths. Within our view, there are only those decisions taken with understanding and care and those that are not. This is the heart of modern investment.

IN THE BEGINNING

Maximizing return and reducing the role of chance in the investment and asset allocation decision have dominated the evolution of investment management. Knowing that it is difficult to forecast return and that all chance cannot be eliminated, investors, industry professionals, and academics have sought ways of understanding the independent elements of the investment

decision process so as to measure their respective contributions and to predict outcomes. These elements include factors such as asset risk, sources of investment return, and the business models integral to determining and delivering an investment decision. As we begin this analysis, the first order is to examine the beginning of the market's attempt to structure and understand risk and value, and to trace those efforts to today's investment tools and practices. Along the way we will discuss the linkages between and among theories and models, such as modern portfolio theory, the efficient market hypothesis, and the capital asset pricing model. Although important tools, each has limitations, and in some instances, each has been distorted to reach fairly unsupportable ends. Finally, we conclude this chapter with an overview of the financial markets and the many ways they have implemented these models in creating new investment products and supporting due diligence efforts.

Modern Portfolio Theory and the Efficient Market Hypothesis

Our starting point is that there are two fundamental directives of security selection and asset allocation: (1) estimate what may happen, and (2) choose a course of action based on those estimates. These directives have been at the core of practitioner and academic debate since the early 1950s. What we describe today as the field of modern financial economics and investment management was created throughout the 1930s, 1940s, and 1950s with the publication of a handful of articles and books. Arguably, the most important were written by Irving Fisher, Benjamin Graham, and David Dodd; Franco Modigliani and Merton Miller, and, finally, Harry Markowitz. Each made important contributions to our understanding of financial markets, security selection, corporate financial decision making, and portfolio construction. The latter is known as *modern portfolio theory* (MPT), which for many is synonymous with Markowitz. Today MPT is now almost 60 years old, and there have been significant advances in thought and practice based on this work. The fundamental concept expressed in Markowitz's article is the ability to measure investment risk based on the comovement of investment returns (i.e., correlations). In other words, Markowitz attempted to provide a scientific foundation for the allocation of investment capital.

In the absence of such a foundation, an investor will have to follow a naïve strategy, in which available capital is allocated among available assets using a rather ad hoc rule (e.g., equally weighted or equal number of shares). The goal of naïve diversification is to create a portfolio that does not include the entire investment universe but could offer a risk-return profile

close to that of the entire investment universe. Using the United States as an example, the performance of an equally weighted portfolio of 50 randomly selected exchange-listed stocks is likely to be very similar to that of a portfolio of all exchange-listed stocks. With the addition of more randomly selected securities to this 50-security portfolio, the risk-return profile of the portfolio will remain mostly unchanged (Exhibit 1.2). To achieve a better risk-return profile, the portfolio must be constructed using the framework set forth by Markowitz and other pioneers in the field of modern investment.

Markowitz formalized the security selection process to form optimal portfolios within the return-and-risk relationship between securities in what is known today as the *mathematics of diversification*. If standard deviations (volatility) and expected returns of available securities, as well as the correlations (comovement of securities) among them can be estimated, then the standard deviation and expected return of any portfolio consisting of those securities can be calculated. From those simple concepts, an industry was born with the sole purpose of constructing portfolios with desirable risk-return profiles. One particular set of such portfolios comprises the so-called mean-variance efficient portfolios—a set of portfolios, each with the highest expected rate of return for a given level of risk (standard deviation

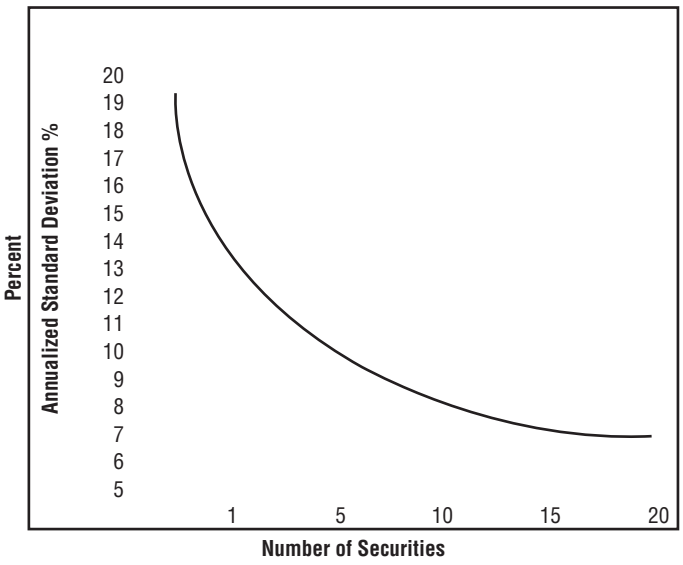

EXHIBIT 1.2 Naïve Diversification

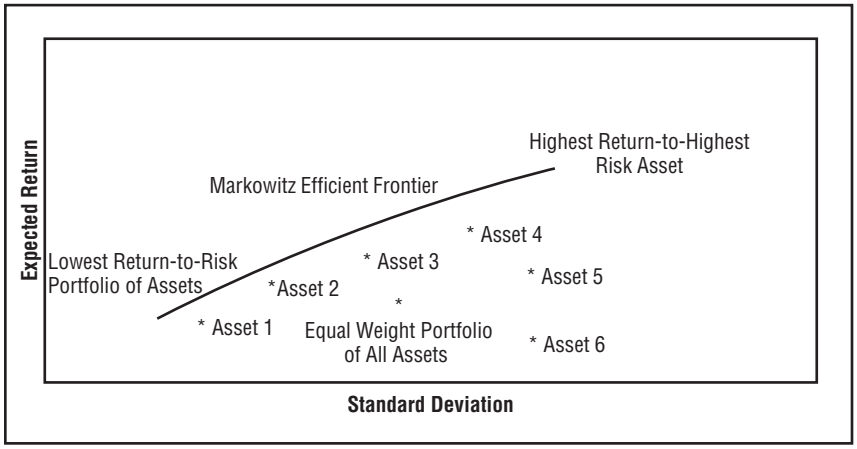

EXHIBIT 1.3 Efficient Frontier

or variance), leads to what is called the *mean-variance efficient frontier* (Exhibit 1.3).

This simple concept—the efficient frontier—has formed the basis of investment management for the past 60 years. It is found in textbooks, in marketing materials, and on the web, with more than 1,770,000 hits on Google (as of the date this chapter was written). However, despite becoming part of the lexicon, the true meaning of Markowitz's efficient frontier analysis has become confused and at times misused. And no wonder: a review of this "simple concept" reveals numerous complicating factors:

- The efficient frontier does not come with a single "one-size-fits-all" inclusive, efficient portfolio construction process. The measured efficient frontier depends on the set of securities analyzed. The efficient frontier for a set of equities differs from an efficient frontier for fixed-income securities, which differs from an efficient frontier for a set of stocks and bonds (Exhibit 1.4). In addition, the portfolios that fall on the frontier typically have weights that are not practical (e.g., large positive allocations for some securities and large negative allocations for others). Further, when the methodology is applied to individual securities, the resulting portfolios typically consist of a large number of securities, making them inefficient when transaction costs are taken into account.
- Between the minimum-risk portfolio and the highest-risk portfolio are a number of portfolios with a mix of assets that constantly change as one goes up and down the efficient frontier line. However, because each portfolio has by design its own level of risk (i.e., standard deviation)

for a particular level of expected return, an investor cannot be certain that the level of expected return will be obtained (if the investor was certain, there would be no risk). In fact, if an investor wanted to measure the expected probability of obtaining a return for a level of measured risk, the result would be more of the efficient cone than the efficient frontier (the higher the risk, the more uncertain the expected return; the lower the risk, the smaller the expected deviation around the expected return).

To construct these efficient frontier portfolios, a researcher needs an enormous amount of inputs. Risk and returns of all securities must be estimated, as well as their comovements. To obtain reasonable estimates of these inputs, there needs to be a fairly long return history associated with these investments; and even with a substantial history, the estimations are uncertain. Over time, firms simply change. Their capital structure, product mix, governance, and interrelationships with other firms and asset classes are in flux. As such, the estimates of needed inputs contain significant uncertainty. No one really knows what the true standard deviation of Exxon stock is now or will be in the future. And of course no one knows the true mean return distribution from which monthly returns on Exxon stock are drawn. Thus, depending on when or how those inputs are estimated, an investor would obtain a different set of efficient portfolios. This means the efficient frontier is really a band, or range, within which the true efficient frontier is likely to lie.

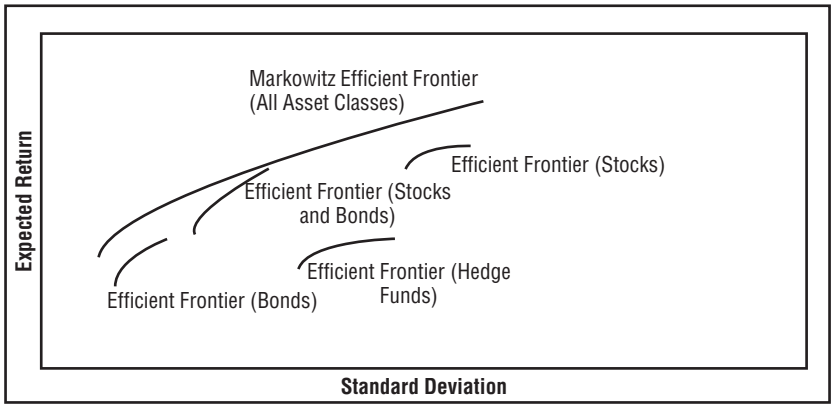

EXHIBIT 1.4 Efficient Frontiers for Multiple Asset Classes

Capital Asset Pricing Model

It is claimed that while reading Harry Markowitz's research, William Sharpe noticed a footnote in which Markowitz wondered about the implications of his prescriptions for investors. In other words, how would one measure the riskiness of individual securities if all investors followed his advice and invested only in portfolios that lie on the efficient frontier? Sharpe followed the logic of this footnote and came up with a model that described the relationship between risk and return of securities. The model, known as the *capital asset pricing model* (CAPM), provided a rather simple framework for measuring the riskiness of investments and established an intuitive relationship between risk and return: the higher the risk, the higher the expected return. The question remains how to measure that risk. In Sharpe's world, there exists a risk-free rate along with the efficient frontier. In such a world, there is a point—a portfolio—which when combined with the risk-free rate offers a set of portfolios that dominates all other portfolios on the efficient frontier. That line is called the *capital market line* (CML), and that portfolio is called the *market portfolio* (Exhibit 1.5). In this world, the risk of an individual security is measured not by its own standalone risk, such as volatility (e.g., standard deviation), but by its marginal contribution to the volatility (risk) of the market portfolio. This leads to the so-called CAPM, in which the expected return of a security is based on a combination of the risk-free rate and an asset's systematic sensitivity to the market portfolio (known as a security's *beta*).[1]

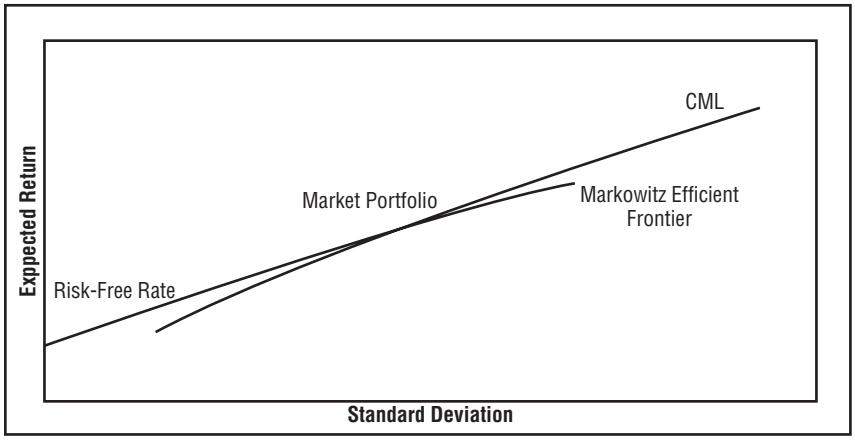

EXHIBIT 1.5 Capital Market Line

The required return of an individual security is therefore not directly related to its standard deviation but to its beta. Thus, in the world of CAPM, all assets are located on the same straight line that passes through the point representing the market portfolio (with beta equal to 1). That line, as shown in Exhibit 1.6, is called the *security market line* (SML). The basic difference between the CML and the SML is one of reference. In the CML, the risk measured is total risk (standard deviation); in the SML, the risk measured is a security's marginal risk to the market portfolio (beta).

Although CAPM has proven to be highly unreliable when subjected to empirical tests, two of its core messages are still true today. First, there are certain risks that can be diversified away rather inexpensively (e.g., by holding the market portfolio), and therefore investors should not expect to earn an additional return for bearing or holding additional risk that is separate from its relationship with the market portfolio. For example, individuals who invest their entire portfolio in the stock of their employer are creating an enormous amount of risk (just ask employees of Enron or Lehman Brothers). The investor should not expect an abnormally high return for bearing the risk of making such an investment. The arguments that risks that cannot be diversified easily and inexpensively (called *systematic risk*) are important determinants of expected returns on various investments and are the enduring legacy of CAPM.

The second basic message of MPT and CAPM is that the creation of efficient portfolios is rather straightforward. Only two investments are required: (1) a highly diversified portfolio of available securities (the market portfolio) and (2) a safe asset. Various combinations of these two

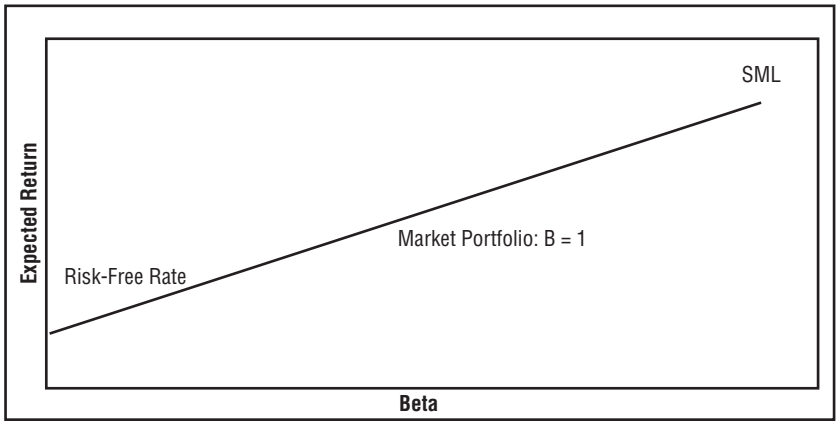

EXHIBIT 1.6 Security Market Line

investments can be used to create all efficient portfolios. If this essential message were accepted and practiced by the entire investment community, there would be no need for this and hundreds of other books written on the subject of alternative approaches to asset allocation and investment management. More important, the asset-management industry would need to shrink substantially and employ far fewer people at far smaller salaries.

Of course, there are many reasons to believe that the simple investment strategy just described would not be suitable for all investors. Most investors have liabilities that need to be funded through their investment portfolio. This means that the portfolio has to be managed in the context of those liabilities. A university endowment has no finite time horizon, and its implicit liability is to help fund the operations of a university. A pension fund has multiple objectives and varied beneficiaries with various time horizons. A family office has one client, but multiple objectives. Clearly, a strategy consisting of various combinations of a well-diversified portfolio and cash cannot possibly be optimal for all of these investors. The message we want to leave investors with is that modern asset allocation requires an investor to see the world the way an institution does: with knowledge of future liabilities; a known time horizon of investment; and a well-defined plan for holding assets, which will hopefully meet those future liabilities in the time frame stated. An additional message is that this asset allocation process is always evolving, and it rarely fits nicely into the one-size-fits-all asset allocation process currently recommended by many financial institutions and investment personnel.

A third message (or more of a practical implication) to be gained from CAPM is that if systematic risk can be measured by a security's beta and that beta can be estimated by the market model, then it stands to reason that an asset's expected return can be forecast using CAPM. Of even greater significance, as is discussed later, if an asset's expected return can be forecast based on its systematic risk, then any excess return greater than that may be attributed to the expertise of an individual manager (in short, the manager's *alpha*, or excess return, is caused by his or her unique skill).

THE BEGINNING OF INFORMATION TRANSPARENCY

As noted, modern investment theory and its implementation is a complex minefield. In negotiating this minefield, with time and disciplined analysis we have moved from the belief that financial markets are unbridled casinos to an understanding that they can be a reasoned risk-and-reward system. To be such, however, and to implement the models as well as test the theories we have examined in the preceding sections requires the support

of a multifaceted industry willing to provide transparent and objective information at a price.

One of the basic results of the MPT and CAPM was that portfolios with efficient risk-return profiles could be constructed rather easily, that is, by combining a well-diversified portfolio of all available investments with-safe assets. An important by-product of this result was that we now had an alternative against which other investment products—and, in particular, actively managed investments—could be evaluated. Benchmarking and return attribution form the cornerstone of the institutional asset-management industry, and investors have benefited greatly from having objective, if perhaps at times flawed, benchmarks to evaluate actively managed investment products.

The development of objective benchmarks led to the concept of *alpha*, or a measure of individual manager outperformance. According to CAPM, a portfolio's expected return is directly related to the level of systematic risk that the portfolio contains. Once the risk of the portfolio is estimated, that estimate can be used as a basis for determining whether the individual who manages the portfolio could consistently choose assets that were fundamentally underpriced and offer an ex post return greater than that consistent with its underlying risk. In sum, could the manager obtain an alpha (excess return above that consistent with the expected return of a similar risk-passive investable asset)? The search for managers who can generate alpha has become a major part of the investment process, especially for institutional investors. However, even in the context of the extremely simplified world of CAPM, a number of parameters have to be estimated (such as a security's beta) in order to implement the model. The net result is that depending on when or how the risk of a portfolio is estimated, the portfolio may display a positive, a negative, or no alpha. And just as important, even when a positive alpha is estimated, there is a high probability that the estimated alpha could be entirely caused by chance (the manager may just get lucky), and therefore the manager may not possess the skills needed to provide alpha in the future.

With the availability of objective benchmarks, we were, for the first time, able to measure an individual investor's performance against the returns of a verifiable financial market. This development not only spawned passive investments or index funds but also put into play one of the unending debates of an evolving industry: Can professional investors consistently outperform similarly mandated passive investments? The resounding answer has been no, especially after fees and taxes. As a collective, money managers have shown an appalling inability to consistently outperform passive benchmarks—no matter the asset class. A recent study showed that over 80 percent of the domestic equity funds managers underperformed their

benchmark in 2011. Over longer historical time periods over 60 percent of active equity managers generally underperformed their benchmarks.[2] These empirical results (the underperformance of active equity managers relative to their passive benchmarks) helped give rise to the creation of a series of investable products and exchange-traded funds (ETFs) that capture the return-and-risk characteristics of these passive benchmarks. This is not to say, however, that money managers do not offer benefits outside of their stated ability to outperform a cited benchmark. In fact, it is the ability of managers to make investment decisions that move a portfolio away from the benchmark in unique market conditions (go to cash when the benchmark is falling) that forms one of the basic benefits of active money managers in contrast to a passive nonactively managed benchmark. Unfortunately, an investor may never know if his money manager has that ability, if for no other reason than that the time period of investment did not include any such events. The investor may wish to continue to use (and pay) the money manager in the hope that the manager will act correctly in some future market, and in the belief that the fees are worth the everyday accounting, managerial oversight, and compliance required for any investment process. (Just choose the manager with the best back office rather than the one with the biggest marketing budget).

While the new concepts of risk-to-return trade-off and benchmarking were being developed and refined by academics and practitioners, another central concept of modern finance was taking shape as well: the *efficient market hypothesis* (EMH). The underlying logic of the EMH is rather simple and entirely consistent with other aspects of modern economics: In a capitalist system, competition among economic entities drives down gross profits to these various economic activities. According to the EMH, competition among investors drives to zero the potential profits from gathering and using information about investment returns. In other words, most, if not all, available and relevant information about security prices gets incorporated into prices rather quickly. Therefore, the expected profit from gathering and using information is nearly zero. In this case, profit refers to earnings in excess of what is needed to pay for the resources employed in the investment process. This includes earning a fair rate of return on the capital employed.

The EMH does not imply that investors make no mistakes or that their expectations about future returns from various investments will not be realized. For example, many have argued that the financial crisis of 2007–2008 clearly shows that the EMH is not valid. After all, we saw many AAA-rated securities default within months of their issue, and stocks of several highly valued financial institutions were sold at a fraction of

their pre-crisis prices. In addition, others have gone further and blamed the EMH for bringing about the financial crisis. Jeremy Grantham argued that the EMH was responsible for the financial crisis because of its role in the "chronic underestimation of the dangers of asset bubbles" by the financial community.[3] Of course, there were bubbles and financial crises long before the concept of the EMH came along. One of the most famous bubbles took place in 1637, when prices for Dutch tulips increased to unimaginable levels, and one of the worst financial crises started in 1929.

The events leading to the 2007–2008 financial crisis and what happened during the crisis are not necessarily inconsistent with the EMH. In fact, it can be argued that some of the losses experienced by homeowners and banks resulted from a lack of faith in the EMH.[4] Homeowners used significant leverage to purchase ever more expensive properties in the hope of earning significant returns from their investments; that is, they believed that the properties were undervalued. Trading desks of banks and other financial institutions poured significant amounts of capital into mortgage-backed securities, believing that they were mispriced. The EMH is a hypothesis that needs to be tested and, like other hypotheses (especially in the social sciences), has many limitations. However, the lack of faith that current prices reflect the best estimate of the true value of an asset is more often than not at the root of financial debacles and crisis. Against all reasoned advice, investors rush to invest in funds that recently outperformed their peers and believe promises made by money managers that there is no need to bear higher risk in order to earn higher returns (e.g., in the case of Bernie Madoff, in which he generated steady above-normal returns for many years). Pre-crisis prices reflect the information available at the time and the way that information was understood by a large majority of market participants. Only a few skilled (perhaps lucky) investors were able to gather and use relevant information about the potential mispricing of some of the assets that crashed in the aftermath of the crisis.

The EMH implies that investors can earn returns that will exceed what their level of risk predicts only if there is some violation of information efficiency (similar to a Monopoly game in which one individual has inside information on what number you will roll). However, if the EMH is true, most investors should not waste their time trying to pick stocks using well-known sources of public information but should concentrate on risk determination and the proper set of assets to capture that expected risk and corresponding return level (you win the game of Monopoly by diversifying across spaces and paying the right price for those spaces—that and a LOT of LUCK). More important, investors need to keep a level head in the game and remember to pick, from a bucket of overall risk choices, one that matches their genuine risk preferences and constraints.

Despite the reasoned purity of the EMH, many investors simply refuse to accept its conclusions. That is, if an investor wishes to obtain investment returns above the average for a particular level of risk, then he needs to bet on being lucky. Perhaps the most striking aspect of the rise of informational transparency is the extent to which it has become commoditized. Most information is increasingly free; however, investors should take heed: prices are available on the Internet for free with about a five-minute lag; if past prices had any value, you would have to pay for them. In short, you generally cannot use private information, and all the other information is worthless.

Like other hypotheses, the EMH has its own limitations. For example, to establish if a particular market is truly efficient, a determination needs to be made as to whether there exists a trading strategy that could generate abnormal returns. Clearly, such a test cannot possibly take place, as there are an infinite number of strategies that could be implemented. In addition, for each strategy, we must be able to measure its true risk. Precise estimates of risk are impossible. In fact, there is no agreed-on universal measure of risk. There are simply indicative estimates, and none of those estimates can determine if a strategy is earning an abnormally high return. Again, it is important to come to terms with what the EMH says and does not say. The EMH states that tomorrow's expected price is equal to today's price times the asset's expected return, where expected return is based on current information (risk assessment). Implicit in this analysis is that markets are subject to correction and that ex post tomorrow's actual price may not equal today's expected price for tomorrow. Further, the EMH says that some free lunches may exist for certain individuals with privileged information, but that such informational advantages do not persist and that profit opportunities that may accrue from that informational divide are quickly eliminated. Since asset prices quickly reflect new information and since no one individual has consistent access to unique information, the EMH says that the only way an investor can earn a higher rate of return is by assuming a higher level of risk. Stated a different way, there are no products with ex ante high rates of return without commensurate risk—and anyone who offers such a product is not telling the truth. History is full of examples, such as:

- High-rated bonds with high yields are in fact wolves in sheep's clothing—they are really low-rated bonds for which the rating companies have simply not gotten around to changing the rating (e.g., various highly rated money market funds before the financial crash in 2008).
- Collateralized debt obligations (CDOs) and collateralized loan obligations (CLOs) or any real estate-backed high-yield investment of the mid-2000s.

Unfortunately, despite warnings or historical facts, many investors do not have the time or discipline to understand the basic tenets of investing. If behavioral finance has anything to say, it is that individuals want to believe. Here, investors believe that somehow, somewhere, there must be someone who can provide the one thing they want: return without risk. We call this the hope over history (HOH) model of investment. At bottom, all we can say is that the EMH suggests that if a manager makes an excess return (e.g., because of access to better technology or information), the investor will be charged a fee equal to the excess return such that the investor's return will be similar to that of the passive index (i.e., manager returns − manager fee = return similar to passive index). The fee covers the cost of acquiring the technology or information, plus the investment made in time and effort to use that technology and information for the investor's benefit.

The emerging tools and theories of asset pricing—efficient market investing, mean-variance efficient frontiers, and CAPM—required knowledge and experience in financial markets. Who better than an investment professional to help the average investor navigate this new world? It should come as no surprise that the birth of today's popular Chartered Financial Analyst certification occurred in the same decade as that of CAPM and the efficient frontier. The place of the financial advisor was no longer based solely on his or her ability to find superior stocks or bonds but in helping investors find their true return-to-risk trade-off. How financial advisors do this—and whether they actually do this or not—is a question to be explored in later chapters, but the evolution of these models depends on the industry's ability to support the basic business model. The single-factor model worked. Once the industry evolved to find ways of selling products that met the requirements of a mean-variance efficient, CAPM, and efficient-market world, advisors did not find it in their interest to change their approach when these models simply reached their end point of applicability.

In short, the two cornerstones of modern finance, MPT/CAPM and EMH, do an excellent job of describing most market conditions for many asset classes. For the most part, markets work efficiently. Financial markets for which there is low-cost information and substantial visibility, and for which asset prices reflect current information—such as the U.S. Treasury bond market—are remarkably efficient. Other markets and assets (e.g., real estate, private equity) require extended risk-based factor models, which capture an enlarged set of underlying risks; therefore, sources of expected returns cannot be explained by these simple models. Small firms that have few analysts following them, less ability to raise capital, a less diversified client base, and less legal support may or may not be priced to reflect those

risks. Many assets are simply not tradable or have high transaction costs (e.g., housing, employment contracts, and distressed debt).

NEW MARKETS, NEW PRODUCTS, AND THE EVOLUTION OF MODERN INVESTMENT

People spend a great deal of time focused on the equity markets for the simple reason that for most investors, this is the primary area of concern; it is also the one area in which most investors feel some level of comfort. The average investor understands the basic message of equity investment: It is something that brings in more money in the future. The average investor also has a rudimentary understanding of the bond market: High-rated bonds are good, and low-rated bonds are bad. However, since the beginning, to go beyond stocks and bonds was to go into a no-man's-land similar to those shown on maps of old—to venture into foreign lands meant passing through seas where monsters lived. Most people had friends and neighbors who owned stocks and bonds; no one owned futures, options, private equity, or commodities.

In the early 1970s, political and economic forces significantly changed the financial landscape of the investment-management industry and, in so doing, changed the way risk could be managed. Just as the simple dividend discount models for stocks, developed and expanded in the 1930s, were all that was needed to determine stock prices prior to the 1960s and 1970s, bond ratings and yields to maturity, also developed and expanded during the 1930s, were seemingly all that was needed to understand how to hold bonds. During the second half of the 1960s, spurred by regulatory change (ability to trade options, removal of fixed exchange rates) and market conditions, considerable research centered on direct arbitrage relationships between assets (pricing models for options and futures) as well as more efficient ways (e.g., duration) of pricing fixed-income securities.

In the early 1970s, Fischer Black and Myron Scholes (1972) and Robert Merton (1973) developed the option pricing model. Similar models had existed before, and in fact, Louis Bachelier, a French mathematician, had developed a rather similar model in 1900. The seminal contributions of Black, Scholes, and Merton was the concept of delta hedging, which meant that at least in theory, an investor could create a synthetic option through a trading strategy involving stocks and cash. This was of enormous value, because it showed market makers how to hedge their option books, making them more willing to take large positions in these derivative markets. Exchange-based trading floors soon came into existence, which helped to eventually develop a market for a wide range of option-based financial

derivatives. Although a range of dynamic futures-based approaches should provide similar risk-management opportunities, options provided a direct and easily measured approach to fundamentally change the risk composition of an asset or a portfolio. Equally important, the model allowed an investor to estimate the insurance cost for modifying the risk of a portfolio. In the decades that followed, new forms of risk management would be advanced that would eventually offer investors a range of risk-management approaches, each with its own unique costs and benefits.

NEW OPPORTUNITIES CREATE NEW RISKS

By the early 1980s, a range of financial products and databases had come into existence that provided the ability to empirically test investment management decision rules. Options trading had grown, and financial futures markets had evolved (Standard & Poor's [S&P] 500 equity index futures contracts came into existence in the mid-1980s). Other changes had taken place regarding technology, regulation, and market structure to provide a set of conditions that supported further development of asset management within a risk-controlled environment. During this period, systemized approaches to tactical asset allocation were being developed and marketed. By the mid-1980s, concepts such as alpha transfer (e.g., taking an equity portfolio, removing its beta with the stock market, and selling the difference to someone who wants alpha with no market risk) and dynamic portfolio insurance were well understood. In addition, during the 1980s, advances in computer technology and software made available for the first time a series of self-serve portfolio management tools that enabled investors to directly manage and adjust their risk exposure. Not only did advances in technology and product development permit investors to manage and adjust risk exposure, but it also allowed investors to take existing assets, dissect their payment streams, and rearrange those payment streams into new assets. The process through which an issuer creates a financial instrument by repackaging financial instruments into a new asset or series of assets came to be known as *securitization*. The classic case in the 1980s was the growth of new mortgage-based products, in which a large pool of mortgages was divided into smaller pieces, which were then sold to investors. Investment firms were able to create entire series of new securities, each with its own unique return-and-risk characteristics that could better meet the risk and return goals of investors. Over the next decades, the securitization industry grew to manage and market an ever-increasing array of financial instruments based on a wide range of underlying securities and cash flows, including credit cards, accounts receivables, and

credit spreads. Unfortunately, as many of these new "structured" forms of securities were created, the underlying risks and rewards became more difficult to determine. In short, the further one moved from the original single-security form (the tree) and concentrated on each new financial asset (the limbs), the more difficult it became to trace the stream of cash flows going to the security.

THE MARKET IS NOT EFFICIENT FOR EVERYONE

Looking back over the 1990s and through the early 2010s, the issues intrinsic to modern investment had less to do with the theoretical models underlying return determination than with the changes in market and trading structures. These changes have led to a rapid increase in the number of available investable alternatives and the growth of the financial advisor industry with associated asset allocation and security selection tools required to service all those individuals who require hand-holding to face the complex world of modern investments. Today, as shown in Exhibit 1.7, the number of investment choices has expanded beyond those available in traditional stock and bond investments to a wider range of alternative investments, including traditional alternatives, such as private equity, real estate, and commodities, as well as more modern alternatives, such as hedge funds and managed futures.

In the past 10 years, academics and practitioners have also come to appreciate that traditional stocks and bonds and the alternatives (real estate, commodities, private equity, hedge funds, and managed futures) have common risk factors that drive returns and that those risk factors are contingent on changing market conditions. Moreover, global and domestic regulatory forces as well as market forces have created a new list of investable products (both exchange traded and over the counter [OTC]). These products include more liquid and readily available forms of traditional

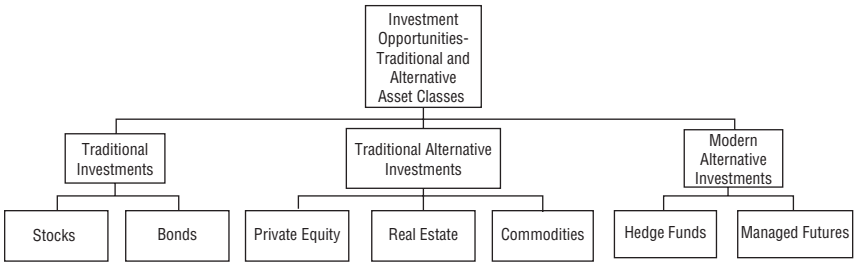

EXHIBIT 1.7 Investment Opportunities—Traditional and Alternative Asset Classes

stock and bond investments (e.g., ETFs and OTC forward and options contracts) as well as investable forms of alternative asset vehicles, such as hedge funds, real estate, and private equity.

The addition of new investment forms has permitted individuals to more readily access previously illiquid or less transparent asset classes and has increased the number of assets that provide the potential for risk diversification in various states of the world. In fact, risk itself has become a more tradable asset. Although options had always provided a means to directly manage risk, previous attempts to directly trade risk had not met with success. In the mid-2000s, various forms of VIX (the ticker symbol for the Chicago Board Options Exchange [CBOE] Volatility Index) began to be traded directly on central exchanges. In addition, advances in various forms of structuring along with algorithmic-based trading products have offered investors a broader set of domestic and international vehicles by which to manage asset portfolios. Finally, the growth of the Internet, along with the expansion of data and product availability and computer technology, has permitted the development of a wide set of new approaches to asset allocation and risk management.

At certain levels of the industry we know what we can reasonably expect from these new products as well as from the various risk-management and asset-allocation systems; however, there is evidence that many investment firms have not changed their current business model to reflect these known changes in market return-and-risk opportunities. The market is never efficient for everyone in that transaction costs differ, borrowing costs differ, and taxation differs such that the actual after-tax return across individuals and institutions varies greatly. In sum, the ability to process and understand information and its consequences differs. The unpredictable nature of risky asset pricing raises the issue of how best to manage that risk. Certainly Markowitz's model, based on estimates obtained from historical figures, continues as a primary means by which individuals attempt to estimate portfolio risk; however, the 2008 market collapse illustrated the fundamental flaw of the Markowitz diversification approach; that is, Murphy's Law of Diversification—assets and markets only offer diversification benefits when such benefits are not needed.

Investment management in its most basic form is the ability to manage the return-to-risk trade-off. For many investment firms, simple models of risk management are best met with simple approaches to asset allocation. For many of these firms, the investment decision still comes down to how much equity and how much debt is required to provide an investor with a conservative, a moderate, or an aggressive risk-return portfolio. What risk levels these three portfolios really provide is not detailed, nor is the fact that the risk of these portfolios is not split equally between the stock and

bond investments but is often impacted primarily by the high-risk stock or bond included in the investment. The potential addition of a range of other investment classes should at least offer one answer to the stock–bond conundrum: Are more investment opportunities better than less? Additional assets may provide investors with greater access to return opportunities that may not exist in most states of the traditional stock and bond world.

A PERSONAL VIEW OF MODERN INVESTMENT

In previous sections, we cautioned against an overreliance on empirically based solutions and simple one-size-fits-all security selection and asset allocation approaches. Each month, financial firms offer a new array of financial products for the investment community. Cost containment and other business concerns generally result in a one-product-fits-all-investors approach. Equally important, the product that is offered is, not surprisingly, the one with the most recent higher return to risk performance. Results based on historical data are just that: results based on historical data. However, despite the often-given admission that past performance is not a forecast of future performance, most investors do not know where else to look. We also stressed the importance of estimation error in the returns as well as model error and estimation error in the parameters used in any individual model. Finally, we pointed out that there exists not only an efficient market in asset pricing but the potential for an efficient market in ideas, such that any ''new'' approach to investment management or asset allocation offering new advances often reflects marketing advances more than an asset-management advance. After all of those caveats, the following chapters present the analysis of various asset classes as if there exists a simple set of rules for determining the underlying risks and returns of each investment area. In short, for purposes of presentation, the following chapters emphasize well-known and often-used measures of risk and return. We use them not because they are the best, but because they are the most popular and the ones most individuals feel comfortable using. At some level we are all guilty of the same sin; we sell what we can, not what we should.

In the upcoming chapters we explore the risk, return, and operational approaches embedded in the major stock, bond, and alternative investment asset classes (e.g., hedge funds, managed futures, commodities, real estate, and private equity). Each chapter may be read as a self-contained unit in that it concentrates on a single asset class without overemphasizing its relationships with other asset classes. After the chapters on each individual asset class, we concentrate on presenting alternative methods of asset allocation

and risk management. We point out that there are no universal solutions for how these asset classes should be combined to form investor portfolios or how the risk embedded in those portfolios should be managed. What is important is that the investor knows the return-and-risk characteristics of each asset class as well as the risks embedded in asset allocation and risk-management models used to create and evaluate the potential benefits of various asset groupings.

The touchstone of evolution is that an entity will adapt in order to survive. Understand that the operative word is *survive*, and survival does not carry an optimization requirement. Thus, we will not find the perfect theory or grouping of products as change comes to the corporate or investment world—or, for that matter, to academic research. Rather, we will find that we have a better understanding of risk and return relationships. Today's growth in off-exchange and screen-traded markets, in contrast to floor-traded markets, is only one example of such understanding and change. There can be, however, a gulf between reality and perception. A delay in an investor's (and here the term is used broadly to incorporate regulators and corporate boards) understanding or market awareness of new research or market relationships often results in a delay in an appreciation of these changes and leads to significant disadvantages in the marketplace.

Change comes from many sources. Modern investment products grew out of economic necessity, regulation, and technological innovations. Currency derivatives came into existence out of the failure of the United States to manage its own currency, and thus the market had to devise an approach to facilitate international trade in a world of uncertain currency values. Individual options grew in the early 1970s as risk-management tools, partly in response to the collapse of the stock markets of the late 1960s and the demand for new means of equity risk management. In the 1980s, the expansion of interest rate futures and the development of equity futures followed, in part, from the Employee Retirement Income Security Act (ERISA) of 1974, which required vesting of pension fund benefits and eventually led to pension fund asset increases to a size that required new means of managing risk. During the 1990s and into the current era, new product creations (e.g., swaps) were part of the changing world of technology and the resulting ability to manage and monitor an increasingly complex series of financial and nonfinancial products.

Although we know very few fundamental truths, one on which we can collectively agree is that the evolution of asset allocation draws on the aforementioned changes flowing from a dynamic world, in which new forms of assets and risk-management tools are constantly being created. Relative risks and returns, and the ability to monitor and manage the process by which these evolving assets fit into portfolios, will change and will be based

on currently unknown relationships and information. Certainly today the challenge is greater, not only because we are working in a more dynamic market but also because the number of investment vehicles available to investors has increased. Hopefully, the following chapters will provide some guidance to meet this challenge.

WHAT EVERY INVESTOR SHOULD KNOW

For many, investments are viewed as an individual snapshot; that is, each investment approach stands on its own regardless of changes in investment models or investment theory. For others, investments can be more easily seen as a road map offering new ideas and approaches while rejecting some traditional investment approaches as old snapshots in an investor's photo album. Chapter 1 provided a brief summary of how some of the most basic approaches to investment came into existence and how some of them have evolved over time. Whatever your view, that is, investments as a snapshot or a road map, there are a number of simple concepts that every investor should know:

- **Know Your Risk Tolerance**: Most security and portfolio recommendations are based on models that remain focused on offering an investor a selection of asset choices based on a series of portfolios, each with a different expected return and risk. Unfortunately, many models use an asset's standard deviation as the proper measure for risk, and for most investors, standard deviation is a poor standalone measure of risk. Risk may be better viewed as a probability of large losses that one cannot recover from or the inability for the investments to match future cash flow needs. Investors should choose investments based on their view of risk tolerance and not the one embedded in a model for firm recommendation.
- **Know the Fatal Flaw in Every Investment Model and Idea**: Every model or investment theory has a logical and finite end point. Rigorously challenge the basic ideas behind investment models and recommendations. Is your advisor using historical returns and risks in creating a portfolio when those returns and risks have no relevance in today's world? Is your advisor recommending a product that does not permit you to easily change as your investment objectives change? Ask your advisor to give you the best case and the worst case scenarios based on the model or models he or she is using to recommend a particular portfolio. Investment advisors have varying degrees of skill and competence. Investors should openly challenge their level of knowledge, credentials, conflicts, and motivations.

- **Limit Your Investment Portfolio to What You Understand:** Every investor has investment limits based on their risk tolerance, knowledge, age, and investment horizon. Some investments are just not suited for some, while well suited for others. Risk-and-return relationships between and among both singular assets and asset classes can and do dramatically change over time. New forms of assets and risk-management tools are constantly being created. If you do not understand or if you feel uncomfortable with certain ideas, just say "no."

MYTHS AND MISCONCEPTIONS OF MODERN INVESTMENT

Change is a common part of the corporate or investment world as well as academic research. Research on the use of various investment processes and their effect on asset management as well as on corporate and financial risk management is an evolving area, not only because new theories come into existence that better explain risk-and-return relationships but also because changes in regulations and trading technology may result in changes in the underlying markets in which assets trade and in which corporate and financial firms operate. Today's growth in off-exchange and screen-traded markets, in contrast to floor-traded markets, is only one example of such change.

A delay in investors' understanding, or even market awareness, of new research or market relationships often results in a delay in investors', corporate officials', and government regulators' appreciation of these changes and the creation of a series of myths and misconceptions about how financial products perform, as well as their effects on financial markets, domestically and globally. That is, as markets change, misconceptions grow and myths (embedded in our experiences) become ways of coping with that change. In short, myths and misconceptions are a fixed part of the investment landscape.

Myth 1.1: Beta Is Dead

For years, academics and some practitioners have attempted to put beta in its grave. In theory, "true" beta is a number that supposedly measures the sensitivity of a security to the market portfolio (all assets) and that, in combination with CAPM, offers the investor a forecast of an asset's expected return relative to other assets. This last statement is important because CAPM does not forecast returns; it only makes a statement about relative returns. In truth, we never measure true beta; we measure "little"

beta, a number that measures the sensitivity of a security to a preselected index (e.g., the S&P 500). As such, little beta is only an approximation for true beta. How close the approximation is depends on the time period used to estimate little beta, the investment interval used (daily, weekly), and the degree to which a firm changes character (holds more debt, hedges current risks). With all of these issues, one might think little beta should be dead. There have even been academics and others who have advocated for models (arbitrage pricing theory [APT], four-factor model) that have been shown to provide somewhat better estimates of relative returns. So why isn't little beta dead? First, it is a simple model that can be easily calculated (a simple Excel function does it for you). Second, it has been enshrined in educational material, marketing documents, and regulatory actions such that any change would require drastic and in some cases illegal actions. Finally, it actually does a fairly good job, especially when you know its limitations. Remember, before you kill something, you ought to have something significantly better to take its place; how else would you explain the change to others who would be resistant for all the aforementioned reasons? Little beta still exists; learn to live with it, but be careful in its use.

Myth 1.2: Mean-Variance Optimization Models Correctly Balance Risk and Return

Although MPT is almost 60 years old, it still forms the basis for much of investment analysis. Financial advisors invariably emphasize the importance of maximizing return while minimizing risk. The primary role of many financial advisors is to find a set of securities that provide excess return (greater than the benchmark) for a level of risk equal to the benchmark. Why hire an advisor if he cannot do better than the benchmark? In short, these advisors emphasize maximizing the mean return for a particular level of risk. This is all well and good, but it is the outcome that you have to worry about. Almost every model of mean-variance portfolio optimization (choosing those assets with the highest expected return for a given level of risk) is expected to be return sensitive. For example, the advisor can use an optimization model to find the optimal portfolio for a level of risk. In that portfolio, if there is one stock that outperforms all the other stocks of similar risk, even if that one stock is only, say, 5 basis points better, it is in and the others are out. Unfortunately, these models end up pointing to stocks that have done better in the past mostly because of pure luck. In the future, two stocks of the same risk should have the same return. In the next period, the stocks that did best in the past (the stocks that you picked) return to the same mean return as the other similar risk stocks, such that the expected

return of your optimized portfolio overestimates its "true" expected return and you end up disappointed—you fail to outperform the benchmark as the model or your advisor forecast. So we know the optimization model has inherent flaws: Its perfection is a myth.

Myth 1.3: Yield to Maturity Is Dead

Some individuals believe the concept of *yield to maturity* (YTM) should be left for dead, except for zero-coupon bonds for which the YTM equals the *yield to duration* (YTD). It is well known—well, obviously not well known, or we would be using it—that two bonds of the same maturity but different coupons could be priced dramatically different. Why do we still concentrate on a bond's YTM? First, it is a simple model. Investors know what "maturity" means (old and wise). They also know what "yield" means (something you get back). Second, to go beyond that puts any financial advisor at risk for sounding too academic, especially when all the other firms continue to emphasize YTM. In truth, in board meetings and investment committee meetings, YTD—a kind of coupon-adjusted YTM—has started to replace YTM, just as some sort of multifactor return model has started to replace beta for stocks. It appears that until economic conditions change such that the difference in YTM and YTD is dramatic (widely different coupons on new and old bonds), YTM will dominate the discussions.

Myth 1.4: Investment Managers Matter

It has been pointed out that one of the investment evolutions over the past 60 years has been from "managers matter" to "benchmarks matter." In fact, both do, just not for the reasons most investors think. First, there are some great managers, although not enough to make a difference in a well-diversified portfolio (no one should risk all his or her money on a great manager—bad things happen to good people). Second, we do not know who the great managers are (as will be discussed later). As an example, let's say for period 1 you take 200 managers and split the sample in two (go long and go short). For period 2, you take the 100 managers who outperform and split the sample in two (go long and go short). For period 3, you take the 50 managers who outperformed and split the sample in two, and so on. After a number of periods, you are down to managers who were in the top group in every year by pure chance. Managers matter, if for no other reason than that someone has to turn the lights on in the morning. Managers matter but not for the reasons normally emphasized.

Myth 1.5: Structured Products Are Dead

In recent years, one of the worst things that could be said about an investment vehicle was that it was a structured product (a product designed from other products to have a unique return-to-risk trade-off). Structured products have existed for a long time and will continue to exist. Structured products allow investment firms to unbundle the risks of various products. For example, an investor in corporate securities may not want to bear the interest rate risk associated with U.S. Treasury securities. In this case, credit default swaps will allow the investor to participate in the credit risk of a corporate bond without participating in the interest rate risk of the same security.

What an investor really wants going forward is not fewer structured products, but more products designed to provide returns in unique risk environments. There are, of course, good structured products and bad ones. There is risk in choosing risky investments; if you cannot live with this, put your money in a bank and have them choose the risky structured products for you (although history proves this doesn't always work out so well, either). Ultimately, we embrace structured products when they work, and we blame others when they do not, but the belief that they are inherently evil does not reflect reality. Within this analysis, if there is a constant, be wary of structured products that are based on a bank's or investment bank's balance sheet. Here, there are a large number of unsystemic risks that are difficult to factor.

Myth 1.6: Behavioral Finance Is the New Normal

Over the past 20 years there has been a body of new work relating to financial theories on why individuals hold certain assets and portfolios of assets. The set of research in this area has fallen under the term *behavioral finance*. It is partially founded in the research of Daniel Kahneman and Amos Tversky, which illustrates that people act differently after wins than after losses. Behavioral finance attempts to explain that behavior and its potential effect on financial markets. While interesting on its own, this work does not have all the requisite market insights to replace other asset-pricing models. This behavioral research tends to work at the micro (individual) but not the macro (market) level and provides only a stopgap to a more complete model of asset pricing. Here, some researchers seem to ignore the fact that CAPM is at its essence a behavioral model of asset pricing (variance counts). More to the point, individuals have very little effect on the day-to-day operations or behavior of financial markets. Large institutional investors and traders dominate the terrain through high-frequency trades

and other models used to immediately respond to changing risk-and-return scenarios. The individual as a dominant force in market behavior is a quaint anachronism.

Myth 1.7: Derivative Markets Promote Increased Market Volatility

We have all heard that it is better to be lucky than to be good. Many new financial ideas, which may have real long-term benefit to the markets, are simply launched at the wrong time and have no immediate market (e.g., volatility-based products in periods of low volatility) or come into existence at a time when their benefits are misunderstood. Most of present-day financial futures and option markets came into existence in the 1980s. When academics looked at the return volatility of the futures-based contracts, in many cases the volatility was greater than the associated cash instrument, or the volatility after the period the futures contracts were introduced was higher than it had been in prior periods. Many individuals cited these as examples of the negative impact of futures and options on market volatility. In fact, it was just the opposite. Futures contracts have lower transaction costs, so people trade a futures contract if prices go up or down just a little. The same price change exists in the cash, but the costs of trading are so high that no one trades there (the cash price remains the same and looks stable, but if you really tried to trade it, there'd be a big price change). More important, futures and option contracts are generally most successful if they are launched in a period of high volatility, as individuals use them to manage risk. In this way, successful futures and option contracts can be considered a type of backfill bias. There is currently a spirited debate over regulation in this area. However that debate turns, this market requires known transparency if it is to reach its full potential value.

Myth 1.8: Global Equity Markets and Bond Markets Act Differently Than U.S. Markets

In the 1970s, one of the most notable academic articles showed the benefits of global diversification. An associated article showed that when two countries start to trade financial assets, the historical pricing relationship and the historical correlation were meaningless until new pricing relationships were established. One of the reasons for the benefits of global diversification was simply that certain companies and industries were primarily traded on local exchanges within their national markets. With advancements in technology and uniform regulation, it is possible for investors to have direct access to geographically dispersed markets. For the most part, while

acting separately, these markets have similar regulatory schemes that foster transparent pricing and the movement of monies on a cross-border basis. Today markets are more similar than different, and certain stocks and bonds trade on exchanges around the globe such that sometime in the future there may well be only one trading market on one big "cloud" in the sky.

Myth 1.9: An Asset's Price Never Changes

Each day, there is a mad scramble at 4:00 p.m. eastern standard time. It is at this time that many U.S. mutual funds and other financial holdings are priced for the day. For most individuals, that price is sacred; it is the price of their holdings until the end of the next day. Of course, by the time they receive that valuation on their smartphone, the actual value of that asset or portfolio of assets has changed (we see it referred to on TV as the "after-market market"). What's more, the price at 4:00 p.m. is not necessarily a traded price, as these prices are sometimes dealer estimates, benchmark-based algorithmic prices, or traded prices from markets long closed. Yet even some academic research is based on those prices actually being true. Investors need to realize that the valuation of their portfolio is only an estimate, and that if they traded that portfolio, its actual value could be dramatically different.