CHAPTER 1

Asset Allocation

An Introduction

Asset allocation has different aims depending on the investor. A younger investor may want to build wealth over time, taking risks that would not be sensible for an older investor. Investors in retirement often want to hunker down to make sure that no unreasonable losses occur. The assets these two investors choose may not differ overall, but the relative weights given to each asset in the portfolio will surely differ a lot. For example, a younger investor will hold a higher proportion of equities than an investor nearing retirement. Institutional investors also differ in their investment strategies. One endowment, perhaps a family foundation, may want to preserve wealth if there are few opportunities to raise more funds in the future. Another endowment, perhaps a university endowment, may follow more aggressive investment policies knowing that there is a steady flow of additional funds from future donors.

This tradeoff between return and risk is central to all asset allocation. It's a genuine tradeoff even though some investors believe they can achieve returns without taking on risk. Asset allocation aims to find ways to make the tradeoff as attractive as possible. One key concept is the correlation between one asset and another. Almost every portfolio has substantial investments in both stocks and bonds because they tend to be low in correlation with one another. Many portfolios include both foreign and domestic assets for the same reason. Similarly, many portfolios include alternative investments such as real estate or commodities because they tend to have relatively low correlations with equities and bonds.

Investors should aim to form portfolios so that if one set of assets suffers low returns in a given period, perhaps another set of assets will provide higher returns. When the economy is booming, for example, equities tend

to thrive as do other investments with equity-like characteristics. When the economy turns down, bonds tend to shine. Or perhaps there are equities from other parts of the world that do well.

Since Markowitz's studies in the 1950s, portfolio management has focused on ways to maximize returns for any given level of risk.[1] Investors should try to form portfolios that have the highest returns possible for that level of risk. But it's just as important to minimize risk for a given target return. There may be several types of assets that would provide the target return, but there is usually a portfolio mixture of these assets that will minimize risk.

To develop such portfolios, it's important for investors to have well-formulated estimates of asset returns. And perhaps more important are the estimates of risk and correlation. To obtain these, it's not enough to just take long-run averages of each asset class. It's important to study each type of asset in detail to understand why it has earned those returns and in what circumstances.

To show what this means, consider the two most basic assets, stocks and bonds. Investors need to ask how much equities or bonds can earn in the long run. We can certainly calculate long-run average returns for each asset class. But these long-run averages would be very misleading if inflation has varied over the sample period. If inflation is running over 10 percent per year, should an investor be pleased with a 12 percent return? So long-run estimates of returns should be done in real, not nominal, terms. But what period should we study?

If we were to examine bond returns in the 1980s to present, we would be enamored with bonds. They are terrific assets with high real returns and relatively little risk. In the long run, by which we mean periods stretching back through the post-war period or back to 1926 (when the Ibbotson SBBI dataset begins) or stretching back to the late nineteenth century, real bond returns are much lower.[2] In those longer periods, real bond returns typically average only 2 percent to 2.5 percent per year. Should we base our estimates of future bond returns on the recent past or on longer periods of history? As explained in Chapter 2, the answer is that the last 30 years have seen a one-time capital gain on bonds as inflation has fallen from double-digits to current levels. Basing future estimates of bond returns on the recent past would be foolhardy.

What about stock returns? Again, the time period chosen is important. In Chapter 2, we will show that post-war stock returns are higher than they have been in the long run. And more importantly, stock returns have been inflated by a rise in price-earnings ratios that may not be sustainable in the long run. Asset allocation requires that the investor understand these assets enough to assess how well they will perform in the future.

INGREDIENTS OF ASSET ALLOCATION

Investing has evolved over the last few decades. First, there is the shift away from individual stock selection toward diversification of stock holdings. Instead of choosing the 10 or 20 best stocks for the portfolio, an investment advisor is more likely to make sure the portfolio is properly diversified between different types of stocks. More specifically, the advisor deliberately balances different styles of stocks, choosing both growth and value stocks and large-cap and small-cap stocks. One reason for this shift in the approach to investing is the realization that investment styles go in and out of favor. For several years or more, growth stocks may outperform value stocks and investors become enthusiastic about new technologies (as they did in the early 1970s and late 1990s). But then value stocks thrive, and investors must switch their allegiances. This shift toward style investing was also driven by the discovery that value stocks provide a value premium over growth stocks and that small-capitalization stocks provide a small-cap premium over large-cap stocks. These premiums will be analyzed in detail in Chapters 3 and 4. Chapter 3 will show how small-cap stocks fit into the overall stock market and will present evidence about whether there is a premium for small-caps. Chapter 4 will examine value and growth stocks and present evidence on the value premium.

In the 1980s, investment in foreign equities gained favor. Capital controls had been lifted making it possible for investors in the industrial countries to spread their investments to other industrial countries. In doing so, investors were able to invest in a wider variety of firms and industries than would have been possible by sticking to U.S. stocks alone. And, because correlations between U.S. and foreign stocks were relatively low, investors were able to reduce risks in the overall portfolio. By the 1990s, interest in emerging stock markets also increased. Chapters 5 and 6 will examine these investments and will show how they help to diversify U.S. portfolios.

Fixed income investments have evolved even more than stock investments. Forty years ago, Treasury and corporate bonds were dominant in fixed income portfolios (along with municipals for taxable investors). There were high yield bonds, but those were typically "fallen angels" rather than newly issued bonds. Mortgage-backed bonds didn't exist because securitization of mortgages was just beginning. Today, Treasuries represent less than 16 percent of the U.S. bond market and corporate bonds another 20 percent. Chapter 7 examines this modern fixed income market in detail.

In Chapter 8, all of these traditional assets are combined in what we call a *strategic asset allocation*, a long-run portfolio allocation based on long-run returns. Modern portfolio theory has given us optimization methods that

allow us to mix assets together in a portfolio in an optimum way. Many investors need to be able to estimate the expected return on a portfolio. For example, foundations need to estimate expected returns in order to formulate spending plans. And estimates are needed by individuals in developing their plans for saving for retirement and for spending during retirement years. This chapter will outline methods for estimating long-run returns for a diversified portfolio.

One of the themes of this book is that future capital markets are unlikely to provide investors with the high returns of the 1980s and 1990s. Bonds are likely to earn their long-run average (real) returns rather than the high returns experienced since the early 1980s, and stocks may not even reach their post-war average returns. So it's natural for investors to look to alternative investments for salvation. There are many alternative investments that might entice investors. But four have gained most attention. These are hedge funds, private equity, real estate, and commodities. Chapters 9 through 12 will study each of these asset classes.

In the last 15 years, hedge funds have become very popular among wealthier individuals as well as many institutional investors. We don't have much data on hedge fund returns and the data that we have available is not of high quality. Yet the asset class itself is fascinating to study because so many different investment strategies are represented. This is the ultimate investment for those who believe in *alpha*, the excess return attributable to investment expertise rather than systematic returns in the market or investment style. Chapter 9 will examine hedge funds.

Investors in private equity have privileged access to ownership in firms not available to the general public. By private equity, we usually mean investments in venture capital and buyout firms. Venture capital provides access to young firms with promising futures. These firms are typically in the technology or bio-technology sectors, but they can be in any industry and any part of the country. Buyout firms are partnerships that invest in older firms that have been taken private. Typically, the buyout firms take total control of the firm in contrast to the venture capital firms that take partial stakes. Chapter 10 will study both types of investments.

Real estate is the alternative investment for the ordinary investor. After all, most investors own their own homes. And many investors also own commercial real estate or other types of investable real estate either directly or indirectly through REITS. This is not to imply that residential real estate and commercial real estate are equivalent investments. In fact, it's important to contrast the returns on each of these investments. Chapter 11 will examine REIT returns as well as the returns earned by institutional investors on commercial real estate investments. But the chapter will also try to determine whether a home is a good investment.

The last 10 years have seen a tremendous commodities boom. So naturally, investors have discovered this asset class, since there is nothing like a burst of good returns to attract attention. Around 2000 in the midst of the tech boom, very few investors included commodities in their asset allocations. After all, the decade of the 1990s had seen very disappointing returns on commodities. That has all changed as oil prices quadruple and the world discovers that it is "running out of resources". Chapter 12 will study the resulting returns.

How much difference do alternatives make to asset allocation? Chapter 13 examines two approaches to alternatives. In one approach, investors confine their alternatives to real estate alone. This is the approach recommended by David Swensen, the director of the Yale endowment, in a book he wrote for ordinary investors.[3] Swensen has been so successful in shifting the Yale endowment away from conventional assets that he became concerned that ordinary investors would try to follow Yale's lead. So he wrote a book showing how conventional investments can provide unconventional success. In the second approach, the assets that Yale and other well-endowed investors prefer are added to the mix. Chapter 13 tries to assess the gains from adding alternatives to the portfolio. And it tries to determine the relative influence of asset allocation and manager performance in those gains.

The book continues with two chapters on spending. After all, investing has an important long-run aim, to provide enough wealth to sustain spending. That's true of a foundation or pension plan trying to grow wealth for current and future spending. And it's certainly true of an individual trying to save enough to sustain spending in retirement. It's even true of a philanthropist who intends to give wealth away because the ultimate aim is to fund spending by the charitable recipient. To study feasible spending rules, it's necessary to introduce simulation methods because the historical record itself will not allow us to anticipate all good and bad future scenarios. The simulation analysis will have to rely on sensible estimates of expected returns and risks, but it's important to consider scenarios where the bad returns occur early and often.

Chapter 14 examines feasible spending rules for foundations. How much can a foundation safely spend out of its portfolio? The answer to that question naturally depends on expected returns, but the first lesson will be that it's real, not nominal returns that matter. Also important will be the correlations and standard deviations of the assets in the portfolio. And included in the analysis will be cases where returns like those in 2008 occur soon after the portfolio is invested. Chapter 15 then turns to the harder case of an individual facing retirement. Why is it harder? A retiree faces mortality risk as well as investment risk. The fact that this investor will die in the future actually allows him or her to spend more than a foundation. But, the

consequences of spending too much may be judged by many as being more severe. For a retiree, running out of money means not just shutting down some spending programs, but running out of food.

The book ends with a short chapter on rebalancing. The theme of the chapter is that asset allocation is hard. It requires that investors sell assets when they are soaring in value and buy assets after they have collapsed. The past decade gives us dramatic examples of such booms and busts.

So this book is about long-run investing and spending. But hasn't this theme been trumped by recent events? After all, how well did even smart investors like the Yale endowment fare in the current downturn? This nagging question may bother investors so much that the lessons of this book might fall on deaf ears. So in the first chapter I would like to address the issue of what good portfolio management can and cannot do.

LESSONS OF THE RECENT DOWNTURN

When the economy hits a downturn, businesses suffer. So it is not surprising that stock markets also suffer. Sometimes the drop in the stock market is severe, so portfolios are devastated. Investors inevitably wish that they had not taken chances in the stock market. Bonds are the place to be.

Since 1951, there have been nine recessions in the United States including the recession that began in December 2007.[4] The recessions themselves will be timed using the NBER's dating scheme. The National Bureau of Economic Research (NBER), a non-partisan research organization based in Cambridge, Massachusetts, has been dating recessions since the 1940s. In every one of these recessions, there has been a sizable fall in the U.S. stock market. The stock market typically begins its fall before the start of the recession, perhaps because investors anticipate the recession and the subsequent fall in corporate profits. Table 1.1 gives the dates of each recession as well as the dates when the S&P 500 index reached its peak and trough. These peaks and troughs are measured using monthly averages of the daily S&P 500 index.

The returns reported in Table 1.1 extend back to the early 1950s. Ibbotson SBBI Yearbooks (©Morningstar) report monthly stock and bond returns extending back to 1926.[5] These returns will be used in many of the tables to follow, so it is important to describe them at the outset. SBBI Yearbooks have two stock indexes. SBBI's Large Company stock index is based on the Standard & Poor's Composite Index. The Composite Index consists of 500 stocks from 1957 onward and 100 large-cap stocks prior to 1957. The specific methodology for computing the return on this index is described in Ibbotson SBBI (2010, p. 43). Unless noted otherwise, the SBBI large-cap series is used only through 1973. After that, the S&P 500 series provided

TABLE 1.1 Stocks and Bonds in Recessions, 1951–2009

Recession (NBER dating)	S&P 500 Peak-Trough	Large-Cap U.S. Stocks	Long-Term Treasury Return
Jul 53–May 54	Jan 53–Sept 53	−8.0%	1.2%
Aug 57–Apr 58	Jul 56–Dec 57	−14.3%	2.9%
Apr 60–Feb 61	Jul 59–Oct 60	−8.0%	8.9%
Dec 69–Nov 70	Dec 68–Jun 70	−26.3%	−4.6%
Nov 73–Mar 75	Jan 73–Dec 74	−36.2%	6.6%
Jul 81–Nov 82	Nov 80–Jul 82	−16.6%	17.8%
Jul 90–Mar 91	Jun 90–Oct 90	−14.1%	0.1%
Mar 01–Nov 01	Aug 00–Feb 03	−42.5%	32.3%
Dec 07–Jun 09	Oct 07–Mar 09	−46.6%	23.4%

The market peak and trough are determined by the monthly average of daily prices for the S&P 500 index. The S&P data is from Robert Shiller's web site, http://www.econ.yale.edu/~shiller/data.htm. The returns for large-cap U.S. stocks and Treasury bonds are from the 2010 SBBI Classic Yearbook (©Morningstar). The large-cap stock returns include dividends.

by Standard & Poor's (via the Zephyr StyleADVISOR database) is used instead. For this reason, the large-cap U.S. stock index will be referred to as the "S&P 500 index" even though it is the SBBI Large-Company Stock series from 1957 to 1973 and a narrower index prior to 1957. SBBI Yearbooks also report a small-cap index that will be described in detail in Chapter 3. There are four fixed income series in the SBBI yearbooks. In this chapter, the long-term Treasury return will be reported. This is the return on the 20-year Treasury bond. Other bond returns will be described in Chapter 7.

Table 1.1 shows the total return on the S&P index (capital gain plus dividends) in each recession since 1951. The returns are monthly returns measured from the peak to trough of the S&P index. Also reported are the returns on the long-term Treasury bond (capital gain plus income) over the same period. As Table 1.1 shows, the negative return on stocks is usually accompanied by a positive return on the Treasury bond. Only in the recession beginning in 1969 did the Treasury bond earn a negative (nominal) return, no doubt because inflation was beginning to rise in the United States. The impact of inflation on bond returns in the 1970s will be discussed in the next section. Otherwise, the Treasury bond fared relatively well during the recessions. In some recessions, in fact, the Treasury bond thrived. This is certainly true of three of the last four recessions when returns were in double digits. So a clear lesson from Table 1.1 is that stocks fare badly and bonds thrive in recessions.

TABLE 1.2 Does Diversification Pay? Returns in the Recent Crisis, October 2007 to March 2009

Asset	Index	Allocation	Return
U.S. bonds	Barclays Aggregate	30%	+7.6%
U.S. stocks	Russell 3000	40%	−46.9%
Foreign Stocks	MSCI EAFE	15%	−53.6%
Emerging M Stocks	MSCI EM	5%	−55.9%
REITS	FTSE-NAREIT	10%	−63.4 %
Portfolio			−37.3%

Data Sources: Barclays Capital, Russell®, MSCI, and ©FTSE.

Sophisticated investors hope that diversification of their portfolios will cushion any downturns. It goes without saying that such investors avoid excessive concentration in particular stocks or even investment in the stocks of particular industries. In the late 1990s, some investors forgot basic principles of diversification and concentrated their investments in the tech sector, much to their regret. Presumably few sophisticated investors have since repeated these mistakes. But suppose that investors have diversified their portfolios with different types of stocks, both foreign and domestic? And perhaps there is diversification beyond equities into real estate? The current downturn raises questions about how effective such diversification really is.

Consider Table 1.2 where a diversified portfolio of stocks and bonds is shown. The portfolio consists of 30 percent in bonds, 40 percent in U.S. stocks, 15 percent in foreign (industrial country) stocks, 5 percent in emerging markets, and 10 percent in REITS. Most observers would consider this portfolio to be pretty well diversified.

Each asset in the portfolio is represented by a well-known index. For example, U.S. bonds are represented by the Barclays Capital Aggregate bond index (formerly the Lehman Aggregate index), an index of investment grade U.S. bonds. Similarly, U.S. stocks are represented by the Russell 3000 stock index which includes both small-cap and large-cap U.S. stocks. Foreign stocks are represented by the MSCI EAFE index of foreign developed-country stocks and the MSCI Emerging Market stock index. Real estate is represented by the National Association of Real Estate Investment Trust's FTSE-NAREIT Reit index.

Portfolio returns are measured from the peak of the U.S. stock market in October 2007 through March 2009.[6] Over this period, U.S. stocks were down 46.9 percent and the portfolio as a whole was down by 37.3 percent. So diversification did not help very much! The reason is that there was virtually no place to hide. Foreign developed country stocks and emerging

market stocks did worse than U.S. stocks, and REITS did worse still. Only bonds offered a refuge.

Is all of this a surprise? The answer is that it should not be. In every downturn, equity and equity-like investments suffer. It's true that the downturn in markets beginning in 2000 did offer shelter in real estate. The S&P 500 fell 42.5 percent in the 30 months from August 2000 until February 2003.[7] REITS, in contrast, rose by 24.9 percent over this same period. So in that downturn, diversification beyond U.S. stocks did help somewhat. But foreign stocks represented by the EAFE index fell 42.3 percent over this same period. And the 70/30 portfolio shown in Table 1.2 fell 18.8 percent.

The 2001 downturn, however, is the exception rather than the rule. Normally, portfolios heavily weighted to stocks have similar losses regardless of how well diversified the stock portfolios are. Table 1.3 presents the returns on different portfolios for the five recessions since the REIT and foreign stock indexes began in the early 1970s. Both portfolios have 30 percent invested in U.S. bonds (in the Barclays Aggregate Bond Index).[8] But one portfolio invests 70 percent in the S&P 500 only, while the other portfolio broadens stock investments to include midcap and small-cap stocks (by investing in the Russell 3000 rather than the S&P 500 index).[9] And this second portfolio has 20 percent in foreign stocks and 10 percent in REITS. So the second portfolio can be described as well diversified as far as equity is concerned.

TABLE 1.3 Does Diversification Pay? Returns on Portfolios in Past Recessions

S&P 500 Peak-Trough	70 % S&P 500/ 30 % Bonds	Diversified Stock-Bond Portfolio*
Jan 73–Dec 74	−24.9%	−24.2%
Nov 80–Jul 82	−6.3%	−4.9%
Jun 90–Oct 90	−9.4%	−9.7%
Aug 00–Feb 03	−26.1%	−18.8%
Oct 07–Mar 09	−33.5%	−37.3%

*The diversified portfolio is the same shown in Table 1.2 consisting of 30 percent in the Barclays Aggregate bond index, 40 percent in the Russell 3000, 20 percent in EAFE (15 percent in EAFE and 5 percent in MSCI Emerging Markets in 1990 recession and after), and 10 percent in the FTSE-NAREIT index. Because the Barclays index begins only in 1976, the Ibbotson Long Term Treasury bond index is used for the first recession. Prior to 1979 when the Russell series began, the Russell 3000 is replaced by a 35 percent allocation to the S&P 500 and 5 percent allocation to the Ibbotson Small-cap index.

Data Sources: Barclays Capital, Russell®, MSCI, ©FTSE, and ©Morningstar.

Does diversification of the stock investments help to mitigate the downturns? The answer is that it often does a poor job when the economy suffers a downturn. Bonds are supreme. It doesn't really matter whether an investor has a simple stock-bond mix or a sophisticated mix of different types of bonds, stocks, and real estate. The investor still suffers losses in the downturn. In the recession of the mid-1970s and the Gulf War recession of 1990, for example, the losses on the simple S&P 500/bond portfolio and the diversified portfolio are almost identical. It's true that either portfolio does better than the S&P 500 alone. But that just shows that bonds are the only refuge in a recession. Even in the downturn of the early 2000s discussed above, diversification of stocks had limited effect. The portfolio that included foreign stocks and REITS fell 18.8 percent. That's better than the 26.1 percent decline of the S&P/bond portfolio, but it's still a big loss. In a downturn, bonds are the one sure place to be.

SO ARE BONDS THE PLACE TO INVEST?

If bonds are such a savior in the current crisis, how good an investment have they been in the long run? Let's focus on the long stock market cycles over the past 60 years that include booms and busts. We might identify four cycles: the post-war expansion, the inflation decade of the 1970s, the boom period of the 1980s and 1990s, and the bust period through March 2009. The timing of these four cycles is arbitrary, but some basis for the timing can be seen in Figures 1.1 and 1.2 where the real return on the S&P 500 is displayed. It's important to examine long market cycles in real (inflation-adjusted) terms because it's the real return that matters to the investor. (For the short periods surrounding economic downturns, it usually doesn't matter whether real or nominal returns are examined). Besides, the inflation decade of the 1970s doesn't look that bad in nominal terms. It's only in real terms that we see the devastation caused by inflation during that decade.

Figure 1.1 suggests that the post-war expansion ended either in late 1968 or late 1972 (when returns were only marginally higher). During that period, the S&P 500 real return was 659.1 percent in cumulative terms or 12.0 percent per year. The subsequent period was a different story. The figure breaks up the period in two phases, Dec 1968 to September 1974 when the cumulative real return was −50.1 percent and October 1974 to July 1982 when the return was +28.6 percent. Over the whole period from Dec 1968 to July 1982, the cumulative return on the S&P 500 was −35.8 percent (in real terms) or −3.2 percent per annum. No wonder stocks fell out of favor during this period.

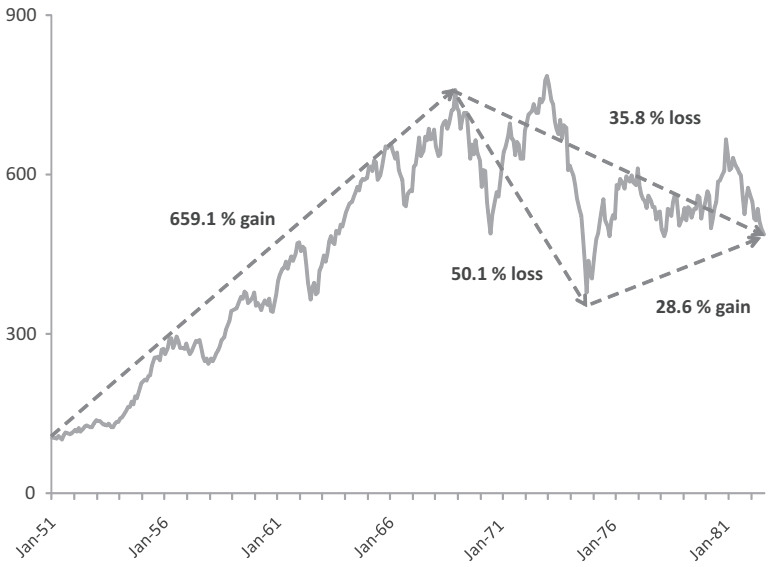

FIGURE 1.1 Real Return on S&P 500, Jan 1951 to July 1982
Data Source: ©Morningstar.

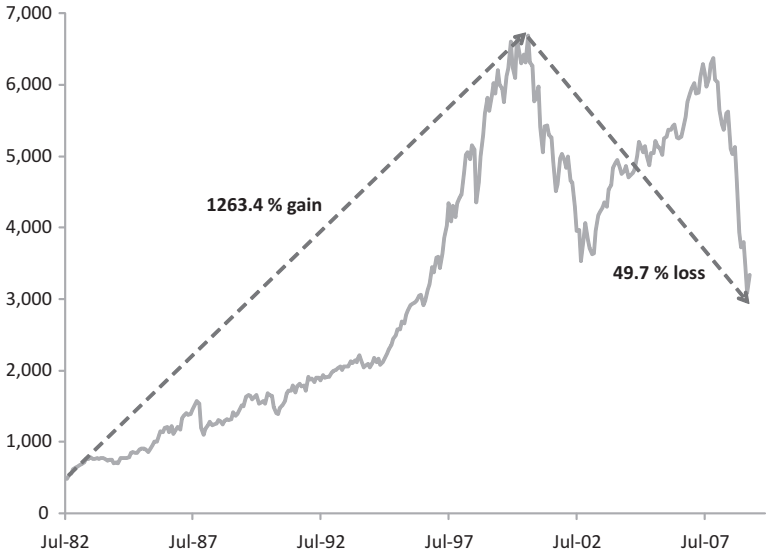

FIGURE 1.2 Real Return on S&P 500, Jul 1982 to Mar 2009
Data Source: ©Morningstar.

TABLE 1.4 Real Returns in Four Market Phases, 1951–2009

	S&P 500		Long Term Treasury	
Dates	Cumulative	Per Annum	Cumulative	Per Annum
Dec 50–Nov 68	659.1%	12.0%	−11.6%	−0.7%
Nov 68–Jul 82	−35.8%	−3.2%	−37.8%	−3.4%
Jul 82–Mar 00	1263.4%	15.9%	328.7%	8.6%
Mar 00–Mar 09	−49.7%	−7.4%	72.7%	6.2%
Whole Period				
Dec 50–Mar 09	3242.0%	6.2%	306.3%	2.4%

The S&P 500 and long-term Treasury bond returns are deflated by the consumer price index.
Data Sources: ©Morningstar and S&P.

Figure 1.2 traces stocks over the subsequent boom period of the 1980s and 1990s. The S&P 500 earned an astounding 1263.4 percent compound real return over the 18 years from August 1982 to March 2000. That's equivalent to a 15.9 percent per annum real return. Since 2000, however, stocks on balance have lost almost 50 percent in cumulative terms, at least through the bottom of the latest bear market in March 2009.

Now let's see just how well bonds would have fared over these same periods. Table 1.4 compares the real returns on the S&P 500 with those on the long-term (20 year) Treasury bond. The Treasury bond had negative real returns during the post-war boom period and during both of the inflation-ridden periods of the 1970s. In the post-war boom period ending in 1968 when stocks averaged a 12.0 percent real return, the Treasury bond had a small negative real return. And in the period from November 1968 to July 1982 when stocks were losing ground to inflation, Treasuries earned a cumulative real return of −37.8 percent for an annual return of −3.4 percent! Stocks and bonds, in fact, were equally miserable investments. The S&P 500 had an average annual real return of −3.2 percent. But bonds are supposed to be the safe haven for investors!

Then in the 1980s and 1990s, Treasuries came alive. As explained in the next chapter, Treasuries did so well because the Federal Reserve gained control over the runaway inflation of the late 1960s and 1970s. Inflation came down, and so did interest rates. There was a *once-in-a-lifetime* capital gain on Treasuries (as well as most other bonds). But Treasury returns paled in comparison with stock returns during this period. Stocks earned an average real return of 15.9 percent per year. Then when the stock market fell astray, Treasuries really started to shine. In contrast with a −49.7 percent

return on the S&P 500, Treasuries have earned over 70 percent over the period beginning in 2000.

The longer historical record, however, certainly raises questions about whether Treasuries should be the primary foundation of a long-term portfolio. Consider the average real return on Treasuries over the full sample period. From 1951 through March 2009, the long-term Treasury bond had a compound return of 2.4 percent/year adjusted for inflation. During the same time period, U.S. large-cap stocks had a compound real return of 6.2 percent. The difference between these two returns is often called the "equity premium". Chapter 2 will discuss this equity premium in detail. The period prior to 1951 was no better. The real return on bonds between 1926 and 1950 was 2.7 percent, while the real return on stocks was 6.3 percent. And this period included the Great Depression! Investors who are currently enamored with bonds had better know the truth about the long-run return on bonds. It's terribly low. And it is not the basis for long-run wealth accumulation.

SO WHAT HAPPENS WHEN THE ECONOMY TURNS UP?

In the middle of a downturn in the U.S. economy, a substantial fraction of investors abandon stocks for good. That's a sensible strategy if the investors are so rich that they can afford to hide out in Treasuries or other types of bonds. With a real return of 2.4 percent, they had better be rich! A $ 1 million dollar portfolio earns only $24,000 in real terms (pre-tax). Try living on that in retirement. But spending 2.4 percent would be imprudent unless the investor was sure that inflation would not rise during retirement. As Chapter 15 will show, an investor needs to keep spending considerably below the expected real return on investments. So an all-bond investor would have to make sure that spending was substantially lower than 2.4 percent. That's a depressing prospect.

But there is another reason why investors need to keep their faith in equities, especially after they have been clobbered with a market downturn. Equities always rise as the economy recovers. Let's study past recessions. In every recession, equities will be traced from their trough during the recession over the 12 months succeeding the trough. Table 1.5 lists dates for the nine recessions since 1951 including the second half of the double-dip recession(s) of 1980–82.

The market trough is determined by the lowest monthly average of daily prices for the S&P 500 price index from Robert Shiller's web site, http://www.econ.yale.edu/~shiller/data.htm. The S&P 500 gain is based on

TABLE 1.5 S&P 500 Rallies After Recessions, 1951–2010

Recession months (NBER dating)	Market Bottom	Gain in first 12 months
Jul 53–May 54	Sept 53	46.0%
Aug 57–Apr 58	Dec 57	43.4%
Apr 60–Feb 61	Oct 60	32.6%
Dec 69–Nov 70	Jun 70	41.9%
Nov 73–Mar 75	Dec 74	37.3%
Jul 81–Nov 82	Jul 82	59.3%
Jul 90–Mar 91	Oct 90	33.5%
Mar 01–Nov 01	Feb 03	38.5%
Dec 07–Jun 09	Mar 09	49.8%

the total return on the S&P (including dividends) from the 2010 SBBI Classic Yearbook (©Morningstar). For every recession, Table 1.5 identifies the month when the S&P 500 reaches its trough for that cycle.[10] Then the table reports the return on the S&P 500 over the next 12 months. In all nine downturns, the S&P 500 shoots up like a rocket once it reaches its bottom. The return on the S&P ranges from 32 percent to 59 percent over the first 12 months. In all but one recession, the recession in 2001, the S&P reaches bottom *before the end of the recession*. So the investor cannot wait for clear signs that the recession has ended. For one thing, it takes the NBER business cycle committee months to decide that a recession has ended. In addition, the S&P usually rises earlier than that date. So market timers have to have unusual foresight!

Let's consider how easy it would be to bob and weave in these market cycles. We know that (a) bonds are supreme during market downturns and (b) stocks are supreme in upturns. So all we have to do is shift portfolios to bonds in time for recessions (or perhaps prior to the start of the recessions). Then we have to shift portfolios back to stocks *just in time*. It's plausible that Japanese automakers can run their production lines successfully with "just-in-time" inventory management. But it may be a trifle more difficult for investors to do the same.

So what should investors do in a downturn? The answer is that they should sit tight. David Swensen of the Yale endowment perhaps said it most clearly. When asked in January 2009 whether poor investment performance in 2008 would induce him to tinker with his asset allocation, he replied "I don't think it makes sense ... to structure a portfolio to perform well in a period of financial crisis. That would require moving away from

equity-oriented investments that have served institutions with long time horizons well."[11]

Actually, investors have to do more than sit tight. If they believe that they have chosen a portfolio appropriate for their circumstances, they will have work to do to keep that portfolio allocation intact. In a boom, portfolios drift up toward assets with higher returns. And in a bust, portfolios drift away from assets with negative returns. So the investor has to sell high-flying assets in a boom and buy poor performing assets in a bust. This is called rebalancing the portfolio. That's a bit counterintuitive.

If an investor is relying on the portfolio for current spending needs, then there is one other thing to do—cut back spending in a downturn. That decision will be discussed in Chapters 14 and 15. It's not a cheery subject, but it's an important one.

That's enough focus on downturns and busts. The investor has to realize that busts do not last forever. Most of the postwar period, for example, has been a time of economic prosperity and positive investment returns. Investors have accumulated wealth. This book will be about how to choose a portfolio that will ensure that wealth accumulation proceeds as smoothly as possible.

SOME NECESSARY TOOLS FOR ANALYSIS

Investments involve returns and risks. So it's necessary to have a few tools to analyze each. This book will try to keep the mechanics as simple as possible. But an investment advisor has to have a few tools to do an effective job for a client. This section will list the tools briefly. An appendix will provide a description of each tool. Most of the tools are standard for any professional in the investment industry. But there is one measure, *alpha**, which may be new to many readers.

First, the advisor needs measures of returns, of which three are important: the *compound* (or geometric) *average*, the *arithmetic average*, and the average *real return*. The real return is obtained by adjusting the nominal return for the inflation rate. The compound average should be used to measure long-run returns, while the arithmetic average is the best estimate of next year's return and is used in many applications of modern portfolio management. Formulas for these averages are given in the appendix.

Second, the advisor needs measures of risk, two of which are the most important. The *standard deviation* is the standard measure of risk for financial assets. It reflects the total variability of an asset return. *Beta* measures only the variability that is systematically related to the market benchmark.

Third, the advisor needs measures of risk-adjusted returns. The *Sharpe ratio* measures the excess return on an asset (above the risk-free return) relative to the standard deviation. So the Sharpe ratio is appropriate for measuring the risk-adjusted return if the total risk of the asset is being considered. *Alpha* is a risk-adjusted return based on only the systematic risk of the asset. That is, alpha is the excess return earned on an asset above that explained by the beta of that asset. Alpha is often used to measure the risk-adjusted contribution of a mutual fund manager. It can also be used to measure the marginal contribution of an individual asset to a market-based portfolio.

The concept that may be new to many readers is alpha*. This is a measure of the excess return on the portfolio itself. Suppose that an investment advisor has measured the return on a portfolio in terms of its Sharpe ratio and wants to compare it with some benchmark. (In a later chapter, the performance of the Yale portfolio is compared with the benchmark of university portfolios as a whole). The advisor could simply compare the Sharpe ratios of the portfolio and benchmark. Sharpe ratios rather than alphas are appropriate because it is the total return and total risk that is being assessed. Alpha* provides a way of comparing the Sharpe ratios by measuring the excess return earned by the portfolio relative to its benchmark. To measure alpha*, the risk level of the benchmark has to be reduced to that of the portfolio. This measure is explained further in the appendix.[12]

With these tools, we can begin studying the assets that will be included in the portfolio. Chapter 2 starts off with the most basic assets, stocks and bonds. How much can we earn on these assets in the long run?

APPENDIX: DESCRIPTION OF THE STATISTICAL TOOLS

There are three measures of returns that will be used throughout the book:

(a) **compound (geometric) average** (R)—the best measure of the long-term return on an asset or portfolio. If r_j is the return in any given period, the compound average is defined by

$$(1 + R) = [(1 + r_1)(1 + r_2) \ldots (1 + r_T)]^{1/T}$$

where T is the number of periods in the sample.

(b) **arithmetic average** (r)—the best estimate of next period's return

$$r = \Sigma_j r_j / T$$

(**c**) average **real return**. The real return is defined using a compound formula as

$$\text{Real return} = (1 + \text{R})/(1 + \pi) - 1,$$

where π is the compound average inflation rate.[13]

There are two measures of risk which will be used extensively in later chapters.

(**a**) **Standard deviation** (σ)—measures the total variability of the asset or the portfolio. It is the square root of the variance, σ^2, defined as

$$\sigma^2 = (1/\text{T})\Sigma_j(\text{r}_j - \text{r})^2$$

(**b**) **Beta** (β)—measures the systematic risk of an asset relative to a market benchmark. If r_A is the return on asset A and r_M is the return on the market benchmark, then

$$\beta = \text{Cov}(\text{r}_\text{A}, \text{r}_\text{M})/\sigma_\text{M}^2,$$

where Cov (r_A, r_M) is the covariance between the asset and the market. Corresponding to these two measures of risk are two measures of risk-adjusted returns.

The **Sharpe ratio**—measures the ratio of a portfolio return to its standard deviation. This ratio is best defined using arithmetic averages because the standard deviation is measured relative to the arithmetic average rather than the compound average. If r_F is the average return on the risk-free asset, then the Sharpe ratio is defined as

$$(\text{r}_\text{P} - \text{r}_\text{F})/\sigma_\text{P},$$

where σ_P is the standard deviation of the portfolio.

Alpha (α)—measures the excess return on an asset relative to its market benchmark.

$$\alpha = \text{r}_\text{A} - [\text{r}_\text{F} + \beta_\text{A}(\text{r}_\text{M} - \text{r}_\text{F})]$$

The expression in square brackets is the return on the market benchmark adjusted for the beta of asset A.[14] So α is the return above (or below) the security market line at the same level of risk as asset A.

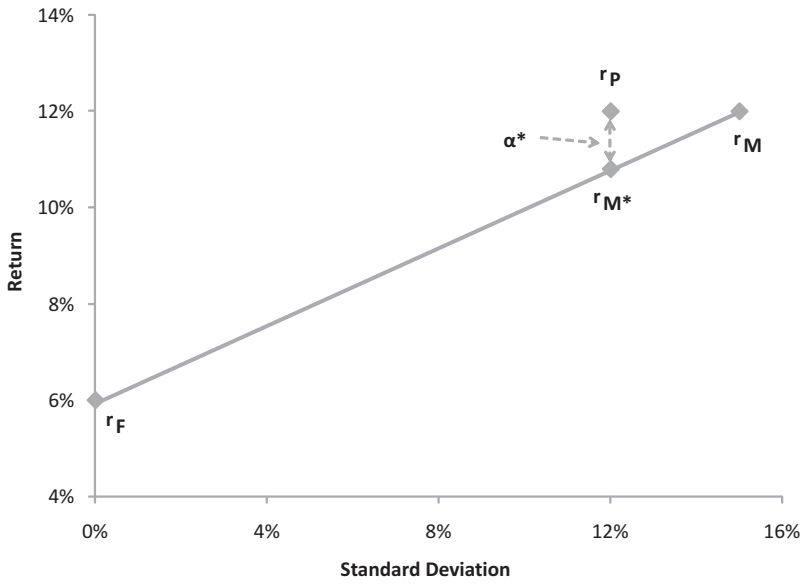

FIGURE 1.3 Evaluation of the Return on a Portfolio using Alpha-Star

If an investor is assessing the performance of an overall portfolio rather than an individual manager or an individual asset in the portfolio, a different excess return measure is called for. That excess return must be measured in the standard deviation space rather than beta space because it's the overall portfolio that is being evaluated, not an individual manager or individual asset. In Figure 1.3, the return on portfolio P, r_P, is compared with a market benchmark, r_M.[15] Most portfolios have less risk than the market as a whole, so it's important to compare returns at a common level of risk. Alpha* brings the risk level of the market down to that of the portfolio to be evaluated.[16] The expression for alpha* (α^*) shows how this is done:

$$\alpha^* = r_P - [r_F + (\sigma_P/\sigma_M)(r_M - r_F)]$$

Thus the portfolio return is compared with the risk-adjusted return on the market where risk is adjusted downward by the ratio of σ_P to σ_M. Alpha* doesn't give any more information about risk-adjusted returns than that which is provided by Sharpe ratios, but alpha* translates differences in Sharpe ratios into excess returns.[17] And excess returns can be understood easily by all investors. Alpha* will be used repeatedly in the book to show how well one portfolio is doing relative to another.

NOTES

1. Markowitz (1952) introduced the efficient frontier, the combination of portfolio returns and risks that maximize return for a given risk. The efficient frontier is discussed in Chapter 8.
2. Ibbotson SBBI returns are reported in SBBI Yearbooks (©2010 Morningstar). See Note 5.
3. David Swensen has written two books of interest to investors. Swenson (2005) is written for ordinary investors while Swensen (2009, 2nd edition) describes investment strategies for institutional investors (or family offices).
4. Technically, there have been ten recessions since 1951 because the recession in the early 1980s was actually a double dip downturn with a recession from January 1980 to July 1980 followed by a second recession from July 1981 to November 1982. In Table 1.1, only the second deeper recession is examined.
5. Ibbotson® SBBI® 2010 Classic Yearbook, ©2010 Morningstar. All rights reserved. Used with permission. (The SBBI series are cited hereafter as "©Morningstar").
6. The S&P 500 reached its low for this cycle on March 9, 2009.
7. The market trough is determined by the lowest monthly average of daily prices for the S&P 500 index. If daily prices for the S&P 500 are used, the trough occurs on October 9, 2002.
8. For the first recession in 1973–74, the Barclays Aggregate index is replaced by the Ibbotson long-term Treasury bond index.
9. The Russell series begins in 1979, so for the 1973–74 recession, the Russell 3000 is replaced with a 35 percent allocation to the S&P 500 and a 5 percent allocation to Ibbotson's Small-cap Index.
10. The trough is measured using the monthly average of the daily levels of the S&P 500 index.
11. Wall Street Journal, January 13, 2009, page C3.
12. Alpha* is explained at great length in Marston (2004).
13. The real return would be almost the same if the inflation rate is simply subtracted from the nominal return, at least in periods when inflation is low.
14. This return is obtained by moving up or down the security market line to the level of risk (β) of asset A.
15. Alternatively, a portfolio return can be compared with other portfolios. In Chapter 13, we compare the Yale portfolio with the average portfolio held by colleges and universities in the United States.
16. Alpha* compares the return on a portfolio with that of the market at the level of risk of the portfolio. Another possible approach is to compare the portfolio with the market at the level of risk of the market. This is what is done by Modigliani and Modigliani (1997) in their M^2 measure. M^2 rather than α^* is more appropriate if a whole group of portfolios is being compared.
17. In fact, alpha* can be expressed in terms of Sharpe ratios. If SP and SM are the Sharpe ratios of the portfolio and market, respectively, then $\alpha^* = (SP - SM)^*\sigma_P$.