



CYPRESS ASSET MANAGEMENT

# Investment Methodology White Paper

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## Our Investment Process

A critical component to your client experience with our firm is the formation of a robust investment plan to guide you and us as we build and maintain your portfolio for you. In this supporting white paper, we discuss in greater depth our methodologies for helping you pursue your goals. Our broad processes consist of five steps:

**Step One: Assessing your goals and circumstances.** The investment planning process begins during the Discovery Meeting with a discussion of your financial values and goals, as well as your key relationships, existing assets, other professional advisors, preferred process and important interests. It continues ongoing as we build a relationship with you.

**Step Two: Setting your long-term investment objectives.** Considering the long-term nature of successful investing, we identify objectives for your portfolio that are appropriate for your willingness, ability and need to take risk and the investment horizon(s) you identify.

**Step Three: Planning your asset allocation.** Because it is so important, asset allocation is the first investment decision. During this process, we determine how much of your portfolio to invest among available asset classes. To address tax efficiency, we also provide guidance on asset location: which investment vehicles should be located in which of your various accounts, based on their tax status. Finally, we add periodic rebalancing to restore your original allocations when market activity causes them to move out of balance.

**Step Four: Understanding the investment strategy.** With asset allocation and location in place, we want you to understand the investment strategy that will be used for your portfolio, and we want to have thoroughly addressed all of your questions. Three key investment principles we stress are the efficiency of capital markets according to the tenets of Modern Portfolio Theory, the importance of diversification and the discipline of remaining invested.

**Step Five: Building your portfolio.** Building on the first four steps, we construct a diversified portfolio suited to your risk profile and specific investment objectives. We typically use high-quality, short- to intermediate-term fixed income securities or funds, along with mutual funds engineered to capture returns from the market dimensions that are appropriate for you. We also adopt a “passive” rather than an “active” investment approach. We take this approach with the goal of building a portfolio that can be purposefully and cost-effectively managed according to your investment policy. Before we proceed, we submit a diagnostic report of your current situation, with our recommendations for repositioning your portfolio to maximize your probability for success. In addition, we consider portfolio costs as well as the potential tax impact of the restructuring.

### Step One: Assessing Your Goals and Circumstances

Long-term investment success means different things to different people. The best investment plan for you depends on your specific circumstances and objectives. That is why we began the investment planning process with a discussion during our Discovery Meeting of your values, goals, relationships, assets, advisors, preferred process and interests.

While everyone's situation is unique, certain factors should be considered in creating any investment plan. These factors include the purpose of the portfolio, its size, specific funding sources, how and when you plan to use the funds, and the degree of uncertainty or risk you are willing to accept in pursuit of your objectives. As we establish a clear vision of your goals and circumstances, together we can build the foundation of an investment plan that best matches your needs as well as the realities of the financial markets.

## Step Two: Setting Your Long-Term Investment Objectives

Investors know they should take a long-term approach to investing. This often gives rise to the question, "How long is long-term?" The answer is: As long as possible. Having a long horizon is a powerful advantage, with time being a strong ally.

For many investors, their most important long-term goal is to achieve the financial independence to do what they want. But most of us also have intermediate-term goals, such as funding college education, travel opportunities or vacation homes.

Investors may also have goals that reach far into the future — for example, they may wish to leave legacies to their children, grandchildren and even great-grandchildren or fund a charitable program to withstand the test of time.

Regardless of the time horizon of your own goals, the simple fact remains that the more time you have, the more likely you are to succeed as an investor. Why? The power of compound growth.

### The Power of Compound Growth

Compound growth operates on a very simple principle. When you put money aside to earn returns, and then reinvest those returns, you have both your original investment and the returns working for you. The longer you allow this process to continue, the greater your accumulation will likely be.

While many people are familiar with the concept of compound growth, they may not be as aware of the vital role that a long time horizon plays in compounding.

To illustrate, consider putting \$1 million in the same investment that consistently earns 8 percent every year. If the earnings are received in cash and are not reinvested, at the end of three years you would have received a total of \$240,000. This compares with the \$259,712 gain you could have achieved had you reinvested all your earnings into additional shares of the same investment. In other words, in this case the power of compounding would have increased your total earnings by \$19,712, or just over 8 percent.

Contrast this with the same comparison over a 20-year horizon. Under the same assumptions, with no compounding, total earnings would amount to \$1.6 million after 20 years. With compounding the earnings would be nearly \$3.7 million. By reinvesting the gains over a 20-year time horizon, compounding would more than double your earnings.

This illustration demonstrates why a long time horizon and the discipline of reinvesting your gains should have an exceptionally high impact on the growth of your portfolio. We would suggest a *minimum* expected investment period of five years for any portfolio containing equities (and the use of short- or

intermediate-term fixed income investments for any portfolio with less than a five-year horizon). This five-year minimum is an important part of any long-term investment plan. In addition to the power of compounding, one-year volatility can be significant for certain asset classes, making it difficult to plan for any particular outcome during such a short time frame. Over a five-year period, volatility is greatly reduced and compounding has time to take effect. A time horizon of 10 years or longer is even better.

## Your Attitudes Toward Risk

While we can do a great deal to mitigate risk, we cannot eliminate it. Nor would we want to, for risk is related to expected return. In any investment plan, it is important to recognize and appropriately manage the types and the amount of risk you are taking. This will greatly increase your ability to adhere to your long-term investment plan, which serves as your roadmap to guide you toward your financial goals.

The right level of risk for you depends on both your personal preferences and your situation. We break the risk equation into the following four parts:

**Part 1. Risk Tolerance: Your Willingness To Take Risk** — Over time, the value of your portfolio will rise and fall. While we would always rather see our portfolio value rise, a prudent investor knows to expect periods, sometimes quite lengthy, in which the value falls. Equity markets, in particular, can be highly and unpredictably volatile.

Your risk tolerance describes your level of comfort and ability to wait through the downturns. If you can tolerate the risk, then you will be able to maintain your investment strategy through both strong markets and weak ones, and remain true to your long-term vision. If the risk is more than you can stomach, it may cause you to abandon your carefully crafted plan.

**Part 2. Risk Aversion: Your Ability To Take Risk** — Designing an appropriate investment strategy requires balancing factors that can be in conflict. Your tolerance for risk may be high, but as a prudent investor you should also consider your ability to withstand financial losses. Because market downturns are unpredictable, you need to assess the real economic harm you might face if your portfolio seriously declined in value.

In other words, what would happen if market risk demonstrated itself and, as a result, the value of your portfolio dropped 5, 10 or even 20 percent, perhaps for an extended period of time? How would this impact your ability to stay the course and remain adherent to your long-term investment plan? What measures would you be able to take (such as postponing retirement or saving more) to make up for the downturn? Would you have the ability to withstand the decline if required to do so? If not, we may need to consider building and maintaining a less risky portfolio.

Other factors that may affect your ability to take risk include your time horizon and your income source(s). For example, if you have a very long time horizon, you may be better able to withstand lower-than-expected returns when they occur. Inflation also needs to be considered in the construction of your portfolio to ensure the expected growth of your portfolio is enough to compensate for inflation's damaging effects. Likewise, the potential overlap of the risks to your sources of income and your investment portfolio should be reviewed and addressed.

**Part 3. Risk Avoidance: Your Need To Take Risk** — Most investors would not choose to take more risk than is necessary. While this is a simple statement, investors often fail to build this concept into their portfolio planning.

Your need to take risk is directly tied to your rate-of-return objective. If you need your portfolio to grow more quickly over your time horizon, you will require a higher rate of return. However, an increase in your rate-of-return objective will generally mean taking more risk. If your higher return objective is inconsistent with your risk tolerance (willingness to take risk) or your risk aversion (your sensitivity to losses), then you must consider adjusting one or more of these parameters. This could mean, for example, retiring later, subjecting yourself to the possible discomfort of greater risk, lowering future consumption or net worth expectations, or increasing your savings.

On the other hand, if your rate-of-return objective can be lowered because your assets can support your goals with less growth, then your need to take risk is reduced and your portfolio should be allocated accordingly. As your portfolio grows over time, your need to take risk should be reassessed and your asset allocation adjusted accordingly.

**Part 4. Your Tolerance for Tracking Error: What If Your Portfolio Looks Different** — Many investors are more comfortable when they know they are doing at least as well as or no more poorly than most other investors. A portfolio that tracks the returns of a popular index such as the S&P 500 Index can provide that comfort, despite the fact that it may not provide the risk management or higher expected returns that may be available from an effectively diversified portfolio.

*Tracking error* is the amount by which the performance of a portfolio differs from that of applicable major market indexes. You should understand your personal tolerance for the tracking error that can result from a portfolio that purposely diversifies away from popular indexes to decrease volatility and increase expected returns. Bear in mind that tracking error can be present for lengthy periods. For example, if your portfolio is weighted heavily toward riskier asset classes with higher expected returns, it can often look quite different from the closest comparable index. The difference can be positive or negative, and may be present over many years.

## **Rate-of-Return Objective**

Every investment choice you make involves a tradeoff between risk and return. In general, the less risk within your portfolio, the lower its growth potential — and vice-versa. To increase the expected rate of return for your portfolio, you will typically have to take more risk. Thus, your rate-of-return objective must match the realistic opportunities that you have, given your time horizon and your risk profile. If your rate-of-return objective is higher than your time horizon and risk profile permit, then you must adjust at least one of the three parameters.

All else being equal, most people would prefer to have a higher expected return. In particular, if two portfolios were equally risky, but one offered a higher expected rate of return, then you would logically choose the portfolio with higher expected reward for your risk.

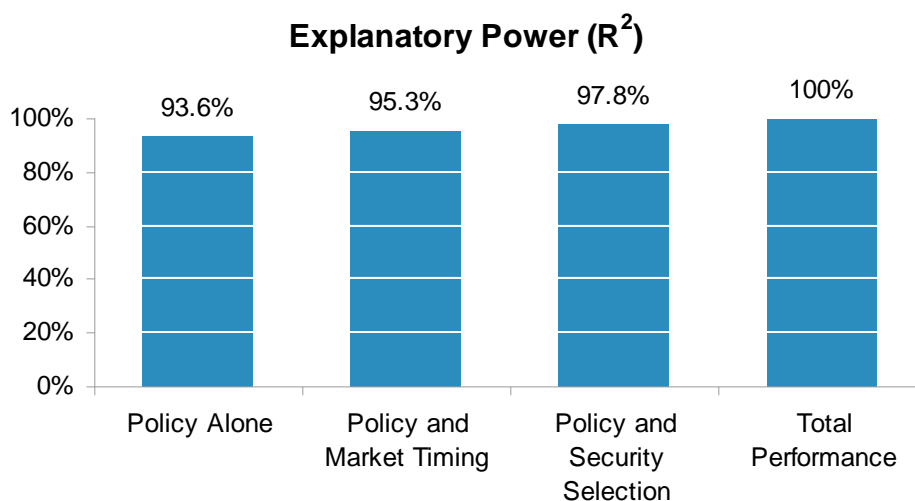
## Step Three: Planning Your Asset Allocation

Once we have worked with you to determine your time horizon, risk profile and a feasible rate-of-return objective, we can begin building your investment portfolio. The first step in this process is **asset allocation**: deciding how much of your portfolio to invest among available asset classes. These typically include equities (both domestic and foreign); fixed income; and, when appropriate, hard assets such as real estate and commodities.

### Asset Allocation: An Overview

Asset allocation should be your first investment decision; the rest of your journey depends upon it. To illustrate how crucial asset allocation really is, one landmark study concluded that differences in returns are explained almost entirely by asset allocation. Market timing and security selection add little to the explanation (and differences caused by market timing and security selection may be either positive or negative).

#### What Explains the Difference in Returns Across Different Portfolios?<sup>1</sup>



By observing how little the bar moves up when adding market timing or security selection to the mix, you can see why we suggest that asset allocation decisions come first.

The most basic asset allocation choice is between **equities** and **fixed income**. To paint with a broad stroke, the choice is a clear example of the basic tradeoff between risk and expected return. Equities represent participation in the long-term growth of companies. Fixed income investments represent fixed obligations of governments and corporations.

It seems natural, then, that equities should offer superior long-term growth potential, while fixed income investments should offer more stability. These essential characteristics lie at the heart of our basic investment approach:

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<sup>1</sup> Source: Gary P. Brinson, L. Randolph Hood and Gilbert L. Beebower, **Determinants of Portfolio Performance**. *Financial Analysts Journal*, Jan/Feb 1995. Information from sources deemed reliable, but its accuracy cannot be guaranteed. Performance is historical and does not guarantee future results. Differences caused by market timing and security selection may be either positive or negative.

- σ Equity is used to maximize expected returns. It is the most appropriate place to allocate any portfolio risk being taken.
- σ Fixed income is used to stabilize the portfolio against the equity risk (and potentially supply a controllable income stream). To play this important role, fixed income investments should be as risk-free as possible.

The bottom line: Building a prudent portfolio requires careful consideration of the unique characteristics of both equities and fixed income and what each can add to the portfolio. We shall cover each in greater depth below.

## **Fixed Income Investments**

As long-term return figures show, an all-equity portfolio has attractive growth potential, but significant uncertainty about the exact outcome. For this reason, we describe an all-equity portfolio as being highly aggressive. It is most suitable for investors who are willing, are able and need to take substantial risk in the pursuit of reward. Most investors generally maintain a portfolio that is less aggressive than an all-equity strategy but more aggressive than all fixed income.

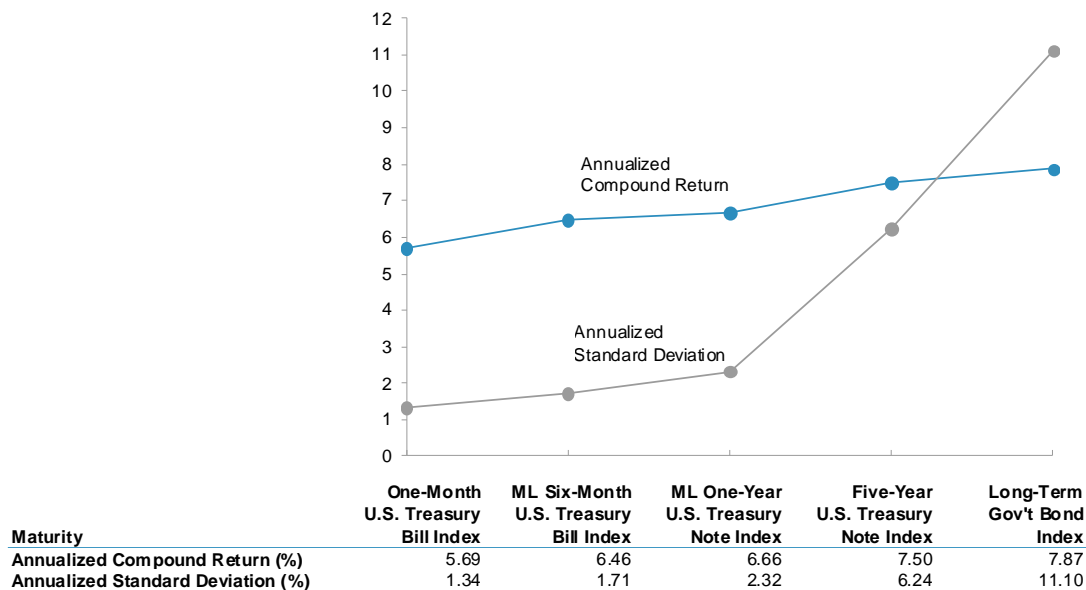
The precise balance is determined by assessing individual investment horizons and risk profile, but a portion of your portfolio's assets will likely be invested in high-quality fixed income investments. Fixed income investments will help reduce the overall level of risk in the portfolio, both because fixed income investments tend to be less risky than equities, and because they represent an additional diversification of your assets. Fixed income investments represent an important way to reduce the overall level of risk to your comfort level.

We recommend that the fixed income investments for your portfolio be in either short- or intermediate-term bonds or bond funds. Whether we implement our fixed income approach using bonds or bond funds depends on the particular requirements for your portfolio.

In terms of variability of total return, long-term bond returns are more volatile and more highly correlated to equity returns than are shorter-term fixed income vehicles such as Treasury bills. And yet, over long time periods, their respective total returns have consistently lagged those of equities. A look at the following graph will help illustrate the higher standard deviations (volatility) without the additional return for the risk taken for maturities beyond five years.

Our purpose in holding some fixed income investments is to mitigate the risk of the overall portfolio. Subject to a given level of risk, we believe a combination of equities and high-quality, short- to intermediate-term fixed income instruments is the most effective way to achieve your objectives. Replacing long-term bond holdings with a combination of equities and short- to intermediate-term fixed income vehicles should maintain the portfolio's expected rate of return while decreasing its volatility.

## Risk and Return Examined for Bonds<sup>2</sup> 1964–2008



Your fixed income allocation (in the form of bonds or bond funds) provides income, and also helps reduce the overall risk in a portfolio. However, because of the fixed nature of the income stream from a bond, there is comparatively little upside potential in a bond portfolio. Investors are sometimes surprised to learn that bond prices can rise and fall with changes in interest rates, but the main source of investment returns from investment grade bonds are the interest payments they make.

When your fixed income investing calls for building custom bond portfolios (as opposed to investing in bond funds), we typically recommend a strategy called “bond laddering.” A bond ladder is constructed by purchasing bonds with staggered maturities (for example, one, two, three, four, five and six years), and then holding each bond to maturity. When each bond matures, the money is generally reinvested in a new bond at the longest maturity of the ladder, thus adding a new “rung” and perpetuating the originally desired structure.

The rationale behind bond laddering is simple. Yields often vary over time. If you were to invest your entire fixed income portfolio in a single maturity, you would risk that your bond might mature at a time when yields are very low. In that case, the new bond you would be buying to replace the matured one would offer very little income.

Laddering is a diversification technique — once the structure is in place, small fractions of the portfolio come due every year, so over time the yield of your overall portfolio would be an average of short- to intermediate-term bond yields over a relatively long time period. You might be buying some bonds in a higher-yield environment and some bonds in a lower-yield environment. In the overall portfolio these would even out, offering substantially less yield uncertainty at the aggregate level. This can effectively minimize reinvestment risk and stabilize cash flow.

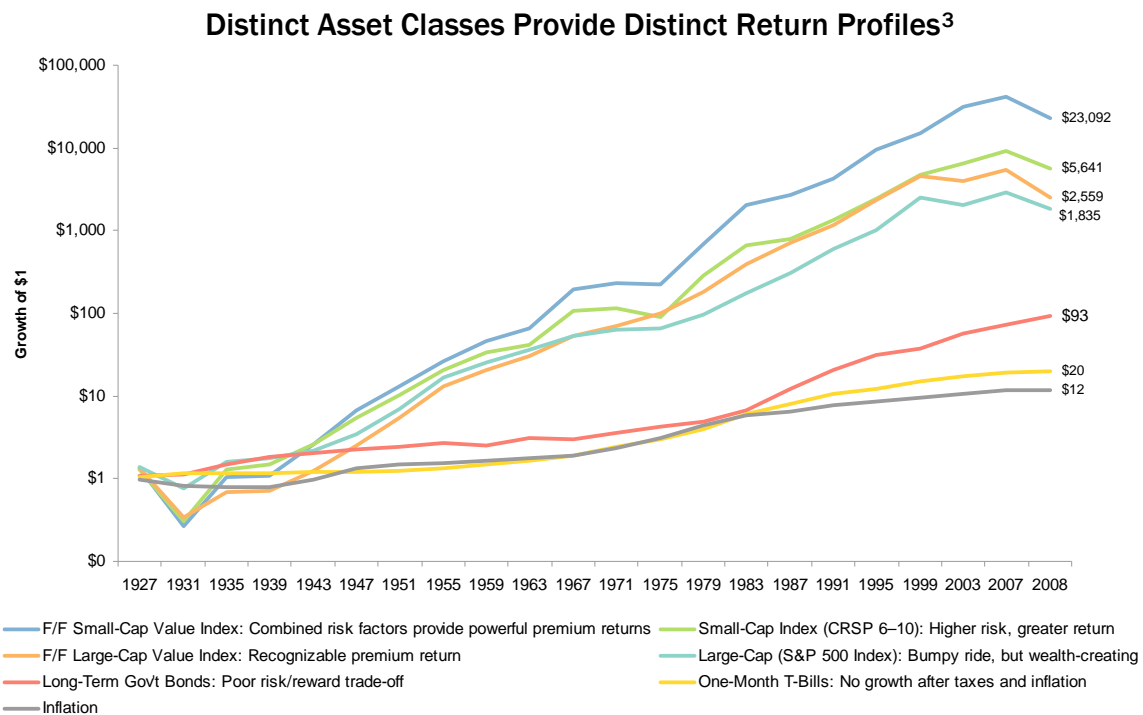
<sup>2</sup> Source: Dimensional Fund Advisors. Indices are not available for direct investment. Their performance does not reflect the expenses associated with the management of an actual portfolio nor do indices represent results of actual trading. Information from sources deemed reliable, but its accuracy cannot be guaranteed. Performance is historical and does not guarantee future results. Total return includes reinvestment of dividends. See Sources and Descriptions of Data Appendix. Standard deviation annualized from quarterly data.

## Equity Investments

The equity asset class can be subdivided among component asset classes including: small-cap (small companies), value (distressed companies), large-cap (large companies) and growth (successful, well-run companies) — both domestic and international.

Why are we concerned with these component asset classes? The ability to allocate funds to them using investment vehicles designed for that purpose offers us another important way to manage and capitalize on appropriate amounts of investment risk beyond simple division between fixed income and equity. Characteristics distinct to each equity asset class have been observed over many years in rigorous academic inquiry, as well as within practical applications to prudent investment strategies (including our own). Each has displayed its own degree of expected risk, and thus expected return. Because pictures speak a thousand words, consider the following two illustrations.

**Return Profiles Chart** — First, consider the following widely used chart, which breaks down the market into its component asset classes:



In the above illustration, you can see that all the equity asset classes have historically outperformed fixed income (as represented by Treasury bills and long-term bonds). Each equity asset class has demonstrated distinct market performance over many decades. Small-cap and value have provided

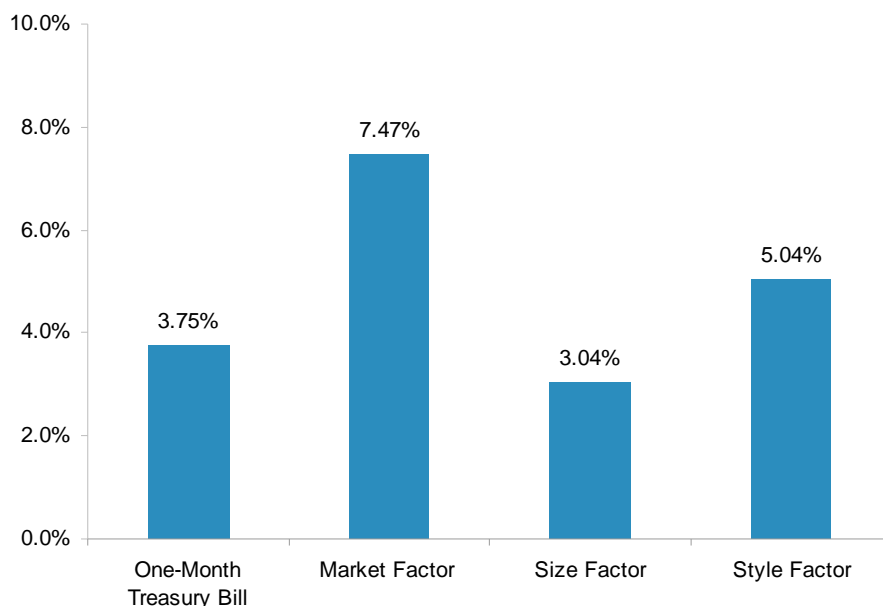
<sup>3</sup> Source: Dimensional Fund Advisors. Indices are not available for direct investment. Their performance does not reflect the expenses associated with the management of an actual portfolio nor do indices represent results of actual trading. Information from sources deemed reliable, but its accuracy cannot be guaranteed. Performance is historical and does not guarantee future results. Total return includes reinvestment of dividends. See Sources and Descriptions of Data Appendix.

higher returns than large-cap and growth. Again, it remains important to note that these higher historical returns have been accompanied by greater risk, which is why academics refer to small-cap and value as “risk factors” — they are riskier than large-cap and growth. (Note: This is not to say that the past indicates future performance; however, it is helpful for indicating reasonable relationships between various asset classes.)

**The Fama-French Three-Factor Model** — Another leading body of work related to asset allocation is the Fama-French three-factor model of risk dimensions, named after its authors, professors Eugene Fama Sr. and Kenneth French.

The Fama-French three-factor model holds that, beyond the return of what is considered a “risk-free” investment (one-month Treasury bill), there are three factors that systematically add risk as well as an expected return “premium” to a portfolio, as depicted in the illustration below.

### Three Factors Determine the Majority of a Balanced Investment’s Expected Growth<sup>4</sup> Average Annual Returns 1927–2008



These factors should be sounding familiar to you by now. They are:

1. **Equities**, which in general have been riskier than fixed income investing. As depicted in the table above, based on average annual returns from 1927–2008, equity investments have yielded an

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<sup>4</sup> Source: Dimensional Fund Advisors (Equity Factors compiled by DFA from Fama-French). Indices are not available for direct investment. Their performance does not reflect the expenses associated with the management of an actual portfolio nor do indices represent results of actual trading. Information from sources deemed reliable, but accuracy cannot be guaranteed. Performance is historical and does not guarantee future results. See Sources and Descriptions of Data Appendix.

additional 7.47 percent average annual premium beyond the 3.75 percent risk-free investment return.

2. **Small-cap** stocks, which have been riskier than large-cap stocks. From 1927–2008, they earned an average annual premium of 3.04 percent more than their large-cap counterparts.
3. **Value** stocks, which have been riskier than growth stocks, outearned growth stocks by an average annual premium of 5.04 percent over the same time frame.

Again, it remains critical to point out that these premiums are by no means guaranteed. They reflect real risk. Greater returns do not occur all the time, otherwise there would be no element of risk. Therefore, the use of risk in your portfolio leads us to a diversified approach to equity investing that includes targeted allocations to an appropriate mix of the various equity asset classes.

When we construct your actual portfolio, we will discuss an appropriate mix for you at much greater length. But in light of your long-term perspective and depending on your willingness, ability and need to take risk, it may well be prudent to seek a higher rate of return by allocating a significant portion of your portfolio to equities as well as seeking greater exposure to the small-cap and value risk factors.

## **International Equity Investments**

The international and U.S. markets also have low correlation. (The lower the correlation, the weaker the relationship between the two holdings, which is good for diversification. For additional detail, refer to the Correlation Coefficients section in Step Five: Building Your Portfolio.)

In addition to taking advantage of the high expected returns attainable in the U.S. equity markets, we will likely advise that your portfolio be invested in international equity markets. They allow you to participate in the growth of the whole global economy, while pursuing increased diversification. By diversifying internationally, you can lower the volatility of your portfolio by combining asset classes with low correlation, while still enjoying the higher expected returns of the equity markets.

Adding further dimension, we usually advise that a portion of your portfolio be invested in international small-cap and value equities. The small-company and value risk factors have been identified in foreign equity markets as well as in the United States, as previously described.

While investors around the world tend to emphasize investments in their home markets, the important thing to realize is that mixing domestic and foreign stocks is a powerfully advantageous investment strategy. By investing in international small-cap and value, your portfolio will gain even greater diversification from the domestic equities you will hold.

## **Emerging Market Equity Investments**

Your global portfolio may also include a small portion in emerging markets. In today's world of equity investing, we are seeing a great deal of growth in emerging markets. The growth rates in these markets have been significantly greater at times than the rate of growth found in established markets. Research indicates that a very small position in emerging markets can increase the expected return of the portfolio without increasing overall portfolio volatility. In fact, because of the low correlation between the emerging market asset class and the other asset classes, the overall portfolio volatility can be reduced.

To minimize the risk of investing in the inherently riskier realm of emerging markets, we choose funds that have stringent selection criteria in choosing appropriate countries to include in this asset class.

**Criteria for Country Selection** — To be considered for inclusion in the emerging market asset class, a country must have the following:

1. A relatively stable political environment
2. A well-organized financial market
3. A market that provides ample liquidity for its shares
4. A good legal system that protects property rights and upholds contractual obligations

While the markets are defined as *emerging*, the companies in those countries are well-established.

## **Hard Assets: Real Estate and Commodities**

In addition to equities and fixed income investments, there are two other asset classes that may be incorporated into your portfolio: real estate and commodities. Because they are tangible, investments in both of these asset classes are called *hard assets*. Each offers its own unique potential benefits and uses in an investment portfolio.

Real estate has historically had a low correlation with equities, meaning that its movements are generally unrelated to the movement of equities. This can help lower the overall volatility in a portfolio, particularly one that is heavily weighted toward equities. In addition, real estate can offer an additional expected return for a given amount of risk when compared to equities.

Commodities have historically had a low or even negative correlation with both equities and fixed income investments. Commodities can thus provide a meaningful reduction of volatility in a portfolio, particularly during times when there are real or perceived crises in the world.

Investments in real estate are typically made via real estate investment trusts, or REITs. Investments in commodities are typically made via futures index funds. Both of these vehicles enable investors to largely capture the available returns in these asset classes in a cost-effective manner.

## **Putting It All Together: Blending and Rebalancing**

The chart below provides a useful summary of much of our discussion. In particular, it showcases the importance of global diversification. It also demonstrates that it is essentially impossible to predict how each asset class will perform in any given year — by itself as well as relative to other asset classes. This lack of predictability is where the risk comes in.

## Asset Class Returns<sup>5</sup> 1984–2008

1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
21.9	67.5	65.4	40.7	38.6	38.3	29.1	48.5	37.3	46.9	16.2	39.8	37.1	36.0	28.6	40.9	49.8	27.0	32.1	79.5	33.2	25.6	36.0	32.7	-37.0
13.7	55.2	59.5	35.1	29.8	31.5	-3.1	47.6	21.5	34.4	14.8	37.6	33.9	35.0	23.1	33.4	31.0	16.4	3.6	69.2	32.1	22.6	33.0	8.0	-39.2
11.6	32.2	19.8	23.8	27.9	30.8	-16.0	31.2	15.1	28.4	5.3	35.1	25.4	33.4	13.2	33.0	15.7	12.4	-2.9	65.6	30.6	15.1	26.3	6.4	-39.7
9.1	29.1	19.4	5.3	26.7	29.0	-17.9	30.5	14.2	26.5	2.7	32.4	23.2	24.3	10.2	30.2	10.9	1.6	-13.8	60.3	25.2	13.8	23.8	5.5	-41.7
6.3	28.7	18.5	5.2	26.0	18.2	-21.6	23.8	7.6	18.7	2.3	20.3	23.0	19.7	-4.6	21.0	4.0	-11.9	-13.8	36.2	18.3	8.0	22.3	-2.2	-45.1
1.1	25.4	7.1	-5.9	22.7	12.0	-23.4	10.0	4.5	15.1	1.3	12.2	19.6	0.4	-5.8	14.2	-4.2	-15.4	-17.4	32.2	17.3	6.2	17.6	-7.1	-46.1
-1.1	10.0	4.4	-6.6	17.5	11.3	-23.4	5.8	-9.8	10.1	1.2	10.3	10.2	-14.1	-17.0	8.7	-9.1	-16.8	-19.1	28.7	16.4	5.4	15.8	-13.5	-46.5
-10.7	6.5	2.1	-13.0	16.8	2.7	-27.3	-6.1	-20.6	-12.3	-3.1	1.0	2.8	-14.6	-35.8	-2.6	-12.3	-31.9	-22.1	20.7	10.9	4.9	-15.1	-17.6	-47.1



This chart often is referred to as “the quilt chart,” because it illustrates how the market is comprised of a patchwork of components. With a deeper appreciation for the value of globally diversified investing based on the broad “quilt” of available asset classes, we hope it is now clear why we typically recommend using a combination of **passive asset class funds** and/or **core equity funds** to build your diversified portfolio. Among other advantages (that we will explore in Step Five: Building Your Portfolio), such an approach enables us to provide unique exposures to your prescribed risk factors.

**Passive asset class funds** are mutual funds designed to broadly represent the market, or some significant segment of the market (such as large-cap or emerging market stocks). They invest in a large number of the stocks within their defined market or segment of the market, with the goal of providing returns that closely approximate those offered by that market or segment of the market. By using passive asset class funds, we seek to lower risk by increasing diversification, achieve market returns, minimize costs and maximize tax efficiency. By choosing a mix of asset classes, including those that have the highest expected return, we hope to exceed the total market’s performance with less volatility.

**Core equity funds** are “premixed” portfolios that own nearly all stocks in their specific markets (U.S. equities, international equities, or emerging markets equities), but concentrate the holdings to provide greater exposure to the risk factors of small-cap and value. By measuring the exposure these funds give to the risk factors in which we choose to invest, we can combine core equity funds and passive asset class funds to provide a portfolio designed to meet your specific investment needs and risk profile. We use core equity funds where possible, because we believe they lower the ongoing costs of your portfolio and may lower the tracking error risk, discussed previously.

<sup>5</sup> Source: Dimensional Fund Advisors. Indices are not available for direct investment. Their performance does not reflect the expenses associated with the management of an actual portfolio nor do indices represent results of actual trading. Information from sources deemed reliable, but its accuracy cannot be guaranteed. Performance is historical and does not guarantee future results. Total return includes reinvestment of dividends. See Sources and Descriptions of Data Appendix.

**Asset location** is a step that works in tandem with asset allocation and fund selection. As described earlier, this is the process of dividing your different types of assets — however they have been allocated — among tax-free, tax-deferred and taxable accounts to maximize the after-tax return of your overall portfolio.

**Rebalancing** is a final tool we add to the asset allocation process. This is the act of restoring your portfolio to its original asset allocations and risk profile. Because each asset class within your portfolio is likely to shrink or grow by a different percentage over time, maintaining your portfolio’s original design is an ongoing process, not unlike periodic maintenance of a carefully shaped topiary. As an added bonus, rebalancing helps you develop sound, long-term investment habits. By trimming allocations that have been recently outperforming, and expanding on those that have been recently underperforming, you are naturally adopting a desirable “buy low and sell high” approach.

At the same time, rebalancing too often or too severely can be costly. Doing so usually entails transaction costs and potentially taxable realized gains. Our role as your advisor is to help you maintain the delicate balance required to help your portfolio maintain its intended shape — without pruning too much or too often.

## **Step Four: Understanding the Investment Strategy**

Our approach to investing is both sophisticated and straightforward. We typically use low-cost institutional managers who construct passive asset class mutual funds and core equity funds, and we diversify broadly to significantly reduce nonmarket risks. The most important factor determining your investment outcome will be your asset allocation. Once you have determined your asset allocation, the next step is to select the investment vehicles that you will use to implement your portfolio strategy.

Two important principles of prudent investing should guide this selection and, in essence, are the same principles reflected within Modern Portfolio Theory:

1. The power of diversification
2. The importance of staying invested

### **Elements of Modern Portfolio Theory**

The basis for the principles in your investment plan is a collection of the best evidence from the academic disciplines of economics and finance. Investment experts usually summarize this evidence as a body of knowledge called Modern Portfolio Theory (MPT).

Passive asset class investing and broad global diversification are rooted in MPT. Several leading financial economists, three of whom received the 1990 Nobel Prize for their contributions, conducted research resulting in its formulation, and our investment strategies are based on it. Many institutional investors have adopted the concept of passive asset class investing. We believe that passive asset class investing offers a lower cost, lower risk alternative to active selection of individual securities or actively managed mutual funds or separate accounts.

The foundation of MPT was a 1952 paper, “Portfolio Selection,” by Dr. Harry Markowitz, in which he

established a theory explaining the best way for an investor to choose a portfolio. His basic theory was that investors should choose a portfolio that offers the best return for a given level of risk — the efficient portfolio. Later work by contributors such as Dr. William Sharpe added to our understanding of how to choose the best portfolio from among a specific set of securities.

In addition, our investment philosophy fully supports, and is supported by, the *Uniform Prudent Investor Act*. Our approach provides for a prudent, fully diversified, cost conscious, performance measured methodology. The American Law Institute, in drafting the Uniform Prudent Investor Rule (which has been adopted by most states as the foundation for their prudent investor rules), stated the following:

- σ Economic evidence shows that the major capital markets are highly efficient.
- σ Investors are faced with potent evidence that the application of expertise, investigation and diligence in efforts to “beat the market” ordinarily promises little or no payoff after taking into account research and transaction costs.
- σ MPT is adopted as the standard by which fiduciaries must invest funds.

MPT has four basic concepts:

1. Markets process information so rapidly when determining security prices that it is extremely difficult to gain a competitive edge by exploiting market anomalies.
2. Over time, riskier assets provide higher expected returns as compensation to investors for accepting greater risk.
3. Adding high risk, low-correlating asset classes to a portfolio can actually reduce volatility and increase expected rates of return.
4. Passive asset class fund portfolios can be designed with the expectation of delivering over time the highest expected returns for a chosen level of risk.

## **Diversification**

One reason that many investors are reluctant to invest much in the stock market is that they know many stories of companies and stocks that have suddenly come on hard times. Some investors imagine an investment in the stock market to be like that — just when their investments have gone very high, it may be just the time that they are about to fall sharply. The mistake in this logic is that they forget that, while a single stock may rise or fall dramatically, the movement of the overall market over time has been generally upward and much more subdued.

MPT provides the reason. It explains that two effects govern the movements of stock market and stock-specific events. It is primarily the stock-specific events that cause individual stocks to move up or down wildly relative to the overall market.

You may think your best protection against stock-specific risk is to use portfolio managers who know all the companies in your portfolio. The trouble is, the events that cause the most damage to stocks usually come as a complete surprise. For example, a company may have a sudden product liability problem or the chairman may die. On the upside, a company may make an unexpected new product announcement or land a major contract. Such events often cause price movements that not even the best portfolio managers expect. In fact, even if an event is anticipated, MPT tells us that the effect of the event is rapidly evident in the stock’s price and no further profit can be gained from knowledge of that event.

If surprises move stocks, then how can an investor protect a portfolio against them? The answer is diversification. The stock-specific movements of individual stocks may not be predictable, but with a diversified portfolio they tend to cancel one another out.

MPT tells us that we can build diversified portfolios to greatly reduce stock-specific risk, but that market events, which affect all stocks, are not diversifiable. That is, even a diversified portfolio of stocks is subject to the overall movements of the market. Fortunately, the theory predicts that the market rewards us for taking this risk by giving us generous long-term growth potential. The asset allocation decision is where we decide how aggressively to pursue this long-term growth (and tolerate the related risk).

On the equity side we believe in extensive diversification, both within each asset class and across asset classes. In addition to the domestic asset classes, we typically allocate nontrivial fractions to international asset classes and hard assets (real estate and commodities). We diversify along dimensions of risk formalized in the Fama-French three-factor model: equity, small-cap (size) and value. We believe the three factors correspond to distinct dimensions of risk. This is a prevalent view in the academic world as well as among a wide range of investment professionals and institutional investors.

We do not believe in what is known as “active” investing: attempting to beat the market by identifying mispriced securities (stock picking) or forecasting the direction of the market (market timing). There is a large and widely accepted body of academic evidence to indicate that such pursuits are not expected to add value to a portfolio commensurate with the costs involved.

We view the fixed income portion of a portfolio as a diversifier and risk-dampener for the equity portion. As such, we avoid volatile fixed income classes, such as long-term bonds, junk bonds and mortgage-backed securities. Instead, we feel the risk-expected return characteristics of a portfolio can be improved if any additional expected return is addressed by varying the stock/bond mix. There are solid arguments, both empirical and theoretical, supporting this view. Therefore, we restrict fixed income investments to high quality, short- to intermediate-term bonds. Since there isn’t much differentiation between such bonds, diversification across a very large number of securities in this asset class is not as important. For this reason, our experienced fixed income team builds customized portfolios of individual bonds for our clients — without trying to predict the future direction of interest rates, changes in the shape of the yield curve or variations in credit spreads.

## **Staying Invested**

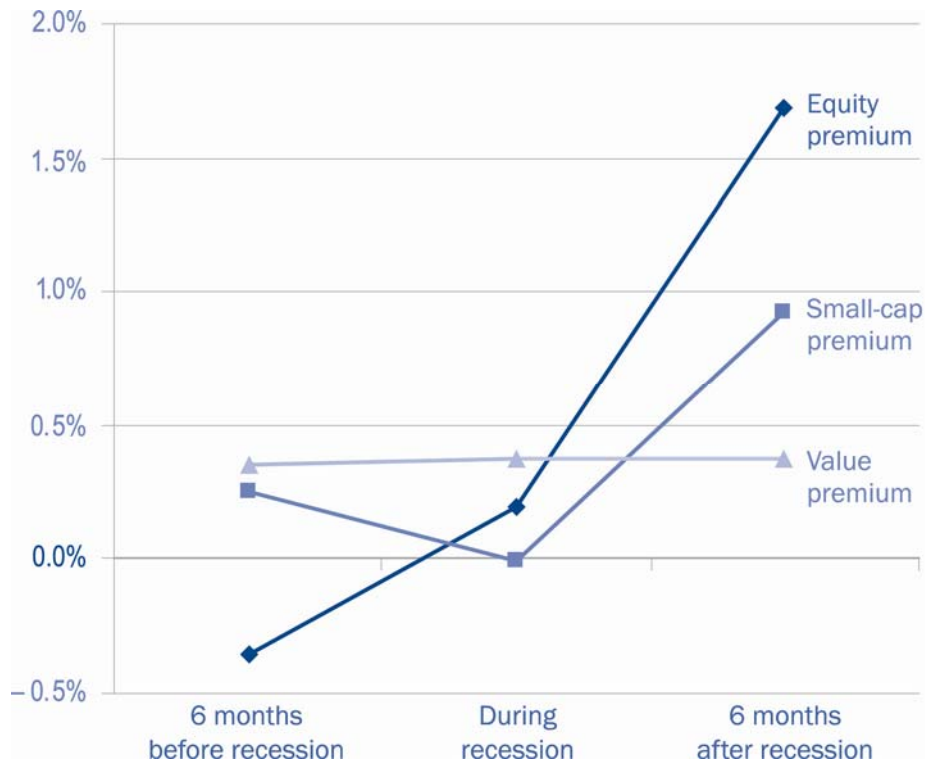
Investors often inquire about the right time to enter or leave the market. Research has indicated that no one can predict the movements of the market for the next month or year.<sup>6</sup> Just as with unanticipated events, if portfolio managers could somehow predict the future movement of the market, then prices in the market would already reflect that knowledge, and so it would be nearly impossible to profit from it.

Instead, we consider it generally advisable to remain steadfastly adherent to a carefully planned equity allocation in accordance with your unique risk profile. Consider, for example, the following illustration of why investors cannot expect to benefit from attempting to time the market based on the arrival or departure of economic recessions.

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<sup>6</sup> For an intelligent and entertaining discussion of this issue, see Burton R. Malkiel, *A Random Walk Down Wall Street*, W. W. Norton & Company, May 1999.

## Equity Risk Premiums: Before, During and After Recessions<sup>7</sup>



Analyzing the past 11 recessions, premiums from taking on equity risks (the extra returns expected by taking on riskier investments) have on average either significantly increased, or at least held firm following the recession. To avoid missing out, it's best to maintain your equity allocations throughout. Although there is always a risk that the market will go down tomorrow, “today” is the right day to start investing and “always” is the right way to stay invested.

<sup>7</sup> **Data Sources: Asset class returns** cited herein are based upon the following indexes (per asset class): S&P 500 (U.S. large), Russell 1000 Value (U.S. large value), Russell 2000 (U.S. small), Russell 2000 Value (U.S. small value), MSCI EAFE net dividends (intl. large), Fama-French International Value (intl. value), MSCI EAFE Small Cap price-only (intl. small), Dimensional International Small Value (intl. small value), MSCI Emerging Markets Free Index gross dividends (emerging markets), Fama-French Emerging Markets Small (emerging markets small) Fama-French Emerging Markets Value (emerging markets value), Wilshire All REIT (real estate) and Dow Jones AIG Commodities (commodities). **Asset class premiums** calculated using Center for Research in Securities Prices (CRSP) and Fama-French databases.

## Step Five: Building Your Portfolio

For most investors, building a truly diversified equity portfolio using individual securities is not the most efficient or cost-effective method. For example, to achieve meaningful diversification in the asset class of large-cap U.S. stocks, you could need several hundred individual stocks.

An effective way to implement a diversified portfolio is through institutional passive asset class funds and/or core equity funds. By buying a fund, in a single transaction you invest in a broadly diversified portfolio within either a specific asset class (for passive asset class funds) or market (for core funds). These funds combine your investment with those of other investors to build a pool of money large enough to buy a diversified portfolio. The portfolio manager's full-time job is making sure that the securities in the portfolio continue to be suitable for the fund's investment objective, as described in detail within its prospectus.

In contrast, individual securities can typically be effectively used to achieve meaningful diversification in a portfolio of high-quality, short- to intermediate-term bonds. When appropriate for your portfolio, our experienced fixed income team will build an individual bond portfolio to address your needs, liquidity requirements and tax situation.

### Fiduciary Obligation

We also comment here on the importance of our status as a Registered Investment Advisor and the resulting fiduciary obligation we accept when building and maintaining your portfolio.

A fiduciary is defined as “one that stands in a special relation of trust, confidence, or responsibility in certain obligations to others.”<sup>8</sup> The fiduciary duty is generally considered the highest legal duty that one party can have to another, and we take that duty very seriously. The Investment Advisers Act of 1940 has been interpreted to provide that Registered Investment Advisors have the following duties: a duty of loyalty and to always act in the utmost good faith; a duty to place clients' interests first and foremost; and a duty to make full and fair disclosure of all material facts and, in particular, information as to any potential and/or actual conflicts of interest.

In contrast, broker/dealer firms that are not Registered Investment Advisors are held only to a “suitability” standard, which requires that products only be suitable, not necessarily in a client's best interest. Thus, such brokers can charge any amount for a product as long as it is “suitable” for the client's portfolio.

The next three sections explain a variety of additional factors we consider in constructing your portfolio. Some of these factors are relatively complex. Mathematics aside, we hope being aware of our fiduciary obligation to you provides a level of comfort that we are always seeking to act in your best interest.

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<sup>8</sup> The American Heritage® Dictionary of the English Language, Fourth Edition. (Houghton Mifflin Company, 2006).

## Expected Rate of Return

“Expected rate of return” is a technical term with a very precise meaning that is quite distinct from the predicting or forecasting attempted by those seeking to “beat the market” through active management. Expected rate of return incorporates the very notion that future returns are random and uncertain: different rates of return are possible, each with a different likelihood of occurring. Expected return is the average of all these possible future returns, each weighed by its odds of materializing. For example, if only two returns were possible — a 6 percent return with 1-to-3 odds, or a 9 percent return with 2-to-3 odds — then the expected return would be 8 percent: (6 percent x 0.33) + (9 percent x 0.66).

We calculate expected rates of return for various asset classes based on the most advanced estimation models developed by leading economists and finance scholars. We then ask some of these scholars to review our methods as well as our assumptions for validity. We use these estimates in calibrating our recommendations for your investment portfolio.

## Standard Deviation

Standard deviation is a measure of volatility. The higher the standard deviation, the greater the volatility. An asset class’s annual total return can be expected to fall within one standard deviation of its expected rate of return roughly two-thirds of the time, and within two standard deviations approximately 95 percent of the time. For example, an asset class with a one-year standard deviation of 5 percent and an expected return of 8 percent would be expected to vary between +13 percent and +3 percent ( $\pm 5$  percent) about 68 percent of the time, and between +18 percent and  $-2$  percent ( $\pm 10$  percent) about 95 percent of the time.

## Correlation Coefficients

The correlation coefficient measures the strength of the linear relationship between the returns of two investments, such as two stocks, two asset classes or two markets. Note that the lower the correlation coefficient, the weaker the relationship, which is good for diversification. Effective diversification is achieved by combining investments that move out of synch with one another.

A basic example of a strong positive correlation would be stock from two oil companies, both of whose prices increase as oil prices increase. A strong negative correlation might exist between an oil company (that would benefit as oil prices rise) and an airline company (that would benefit as oil prices fall). In other words, low correlation, rather than high, is what makes diversification meaningful.

Correlation coefficients are measured on a scale from  $-1.000$  to  $+1.000$ , with  $+1.000$  indicating that the two asset classes are perfectly positively correlated. In portfolio construction, it’s critical to blend asset classes with low or even negative correlation coefficients. (Negative correlations are relatively rare.)

## Passive Versus Active Investing

Especially during periods when the market is on the rise, many investors experience regret, wondering whether they could have earned better returns than they did had they selected a different investment approach. Unfortunately, most investors who succumb to this type of regret are using the wrong tools and put themselves at a significant disadvantage. They invest in what are known as “actively managed”

funds or other active vehicles, whose managers seek to outperform the market by predicting the future of either individual stocks or sectors, or entire markets.

**Passive Investing in Efficient Markets** — Active investors assume that the market is generally “inefficient.” If the market were inefficient, it would mean that clever individuals (or their clever brokers) could regularly exploit opportunities when holdings were trading for more or less than they were actually worth. Opportunities would need to be of sufficient frequency and value to cover the costs of consistently seeking and executing such trades.

There is significant academic evidence that the collective wisdom of all market players — especially in today’s electronic era — results in highly efficient markets that reflect fair pricing almost instantaneously upon release of any news (good or bad) that might affect a holding’s price. For example, a 2002 *Journal of Financial Economics* study analyzed how stock prices reacted to good and bad news reported on CNBC’s Middy Call. Following a stock’s positive coverage, its price increased within seconds, with the phenomenon lasting approximately a minute. Bad news reaction was more gradual, lasting for 15 minutes following the news. The study’s authors concluded that, “the market is efficient enough that a trader cannot generate profits based on widely disseminated news unless he acts almost immediately.”<sup>9</sup>

A passive investor assumes that opportunities to exploit inefficiencies are too few and far between to effectively pursue. It would be like spending one’s day trying to find lost dollar bills on the sidewalk. It’s fun if you have such luck, but it’s no way to earn a living. That is why we acknowledge that the markets are generally efficient and we advise according to a passive rather than an active investment approach.

**Passive Investing To Control Costs** — Passive investing also provides a highly effective way to address another factor that is critical to your investment success: controlling costs.

All mutual funds and separately managed accounts have expenses that include management fees, administration charges and custody fees. These are expressed as a percentage of assets. The average annual expense ratio for all retail equity mutual funds handily exceeds 1 percent. In comparison, the same ratio for passive asset class funds is typically only about a third of all retail equity mutual funds.<sup>10</sup> All else being equal, we would expect lower costs lead to higher rates of return.

Beyond account management expenses, there are many other costs to be managed, including trading/turnover expenses, taxes and “the cost of cash” (incurred when a mutual fund holds a portion of your assets in cash rather than fully invested, continuously earning market returns). Passive investing is not the only way to seek to minimize such expenses, but we have found it to be an effective way.

**Passive Investing and Appropriate Asset Allocation** — As we have discussed, perhaps the most important determinant of portfolio performance is asset allocation — how your assets are exposed to various risk factors. Because effective asset allocation requires your portfolio to maintain consistent exposure to these risk factors, the investment vehicles from which you build your portfolio also need to stay within their defined target asset classes. Unfortunately, most retail actively managed funds effectively have you relinquish control of your asset allocation. They may overweigh or underweigh

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<sup>9</sup> Jeffrey Busse and T. Clifton Green, **Market Efficiency in Real Time**. *Journal of Financial Economics* 65 (2002), pages 415-437.

<sup>10</sup> For example, refer to *InvestmentNews*, “Study: Performance depends on asset class,” July 10, 2006, compared against fund expense ratios listed for the strategies on Dimensional Fund Advisor’s Web site ([www.dfaus.com](http://www.dfaus.com)).

specific parts of the market in their quest to achieve higher rates of return, or move a portion of your assets out of the market entirely. In contrast, because of their investment mandates, institutional passive asset class and core equity funds must stay fully invested in the specific asset classes they represent.

**Why Our Firm Passively Manages** — We conclude with why our firm has adopted a passive asset class approach to investing. We believe our approach fosters a relationship grounded in fiduciary obligation, while effectively incorporating academic evidence on how markets can be used to pursue your financial independence. Just as asset allocation should be among the first steps toward building a long-term portfolio to meet your unique goals, selecting an advisor who espouses a passive management approach can be among the first steps toward building a long-term trusted advisor relationship.

# Sources and Descriptions of Data

## U.S. Equities

### S&P 500 Index

Courtesy of Roger G. Ibbotson and Rex A. Sinquefeld, *Stocks, Bonds, Bills and Inflation: The Past and the Future*, Dow Jones, 1989. Ibbotson Associates, Chicago, annually updates work by Roger G. Ibbotson and Rex A. Sinquefeld. Used with permission. All rights reserved.

### CRSP Deciles 9–10 Index

Courtesy of Center for Research in Security Prices (CRSP), University of Chicago. Small company universe returns (Deciles 9–10) — all exchanges.

January 1926–June 1962: NYSE, rebalanced semiannually.  
July 1962–December 1972: CRSP Database, NYSE and AMEX, rebalanced quarterly.  
January 1973–September 1988: CRSP Database, NYSE, AMEX and OTC, rebalanced quarterly.  
October 1988–present: CRSP Index (NYSE, AMEX and OTC).

### CRSP Deciles 6–10 Index

Courtesy of CRSP, University of Chicago. Small company universe returns (Deciles 6–10) — all exchanges.

January 1926–June 1962: NYSE, rebalanced semiannually.  
July 1962–December 1972: CRSP Database, NYSE and AMEX, rebalanced quarterly.  
January 1973–September 1988: CRSP Database, NYSE, AMEX and OTC, rebalanced quarterly.  
October 1988–present: CRSP Index (NYSE, AMEX and OTC).

### CRSP Deciles 1–10 Index (market)

Courtesy of CRSP, University of Chicago.

January 1926–June 1962: NYSE, rebalanced semiannually.  
July 1962–present: CRSP deciles 1–10 cap-based (market) portfolio, rebalanced quarterly.

### Fama-French US Large Growth Index (excluding utilities),

### Fama-French US Large Cap Index,

### Fama-French US Large Cap Value Index (excluding utilities),

### Fama-French US Small Growth Index (excluding utilities),

### Fama-French US Small Cap Index and

### Fama-French US Small Cap Value Index (excluding utilities)

January 1927–present: Courtesy of Fama-French and CRSP. Upper-half market cap, upper 30 percent book-to-market. Buy range-only, no simulated hold range or estimated trading costs, rebalanced quarterly.  
Composition: U.S. operating companies trading on the NYSE, AMEX or Nasdaq NMS. Maximum weight of any security in a portfolio is 4 percent.  
Exclusions: ADRs, investment companies, tracking stocks before 1993, non-U.S. incorporated companies, closed-end funds and certificates.  
Sources: CRSP databases for returns and market capitalization: 1926–present. Compustat and hand-collected book values: 1926–1992. CRSP links to Compustat and hand-collected links: 1926–present. Book-to-market ratios provided by Dimensional Fund Advisors (DFA): 1993–present.  
Breakpoints: Before June 1996, the small-cap portfolios contain firms with market capitalization below the 55th percentile of all eligible NYSE firms, and the large-cap portfolios contain firms with market caps above the 50th percentile. From June 1996 to December 2000, the size breakpoint for all portfolios is the market cap of the median eligible NYSE firm. The book-to-market breakpoints for 1926 to 2000 split the eligible NYSE firms with positive book equity into three categories: the top 30 percent are in value and the bottom 30 percent are in growth.  
Starting in January 2001, the size breakpoints are defined by cumulative market cap percentile rules. Small-cap is the bottom 8 percent of the overall stock market and large-cap is the top 90 percent. The book-to-market breakpoints are defined by the firms in the relevant size range.  
The breakpoints for small-cap value (high book-to-market) and small-cap growth (low book-to-market) assign 25 percent of the total market cap in the small-cap size range to each portfolio. The book-to-market breakpoints for large-cap assign 10 percent of the market equity of large firms to the large-cap value portfolio and 20 percent to the large-cap growth portfolio.  
Rebalancing: Annual (at the end of June): 1926–1992. Quarterly: 1993–present.

### Dimensional US Micro Cap Index

Courtesy of CRSP and Compustat.

June 1927–present:

Dimensional US Micro Cap Index.

Composition: Market-capitalization-weighted index of securities of the smallest U.S. companies whose market capitalization falls in the lowest 4 percent of the total market capitalization of the eligible market. The eligible market is composed of securities of U.S. companies traded on the NYSE, AMEX and Nasdaq Global Market.

### Dimensional US Small Cap Value Index

Courtesy of CRSP and Compustat.

June 1927–present:

Dimensional US Small Cap Value Index.

Composition: Companies whose book-to-market ratio falls in the top 25 percent of U.S. small-cap companies after the exclusion of utilities, companies lacking financial data and companies with negative book-to-market ratio. The eligible market is composed of securities of U.S. companies traded on the NYSE, AMEX and Nasdaq Global Market.

### Dimensional US Large Cap Value Index

Courtesy of CRSP and Compustat.

June 1927–present:

Dimensional US Large Cap Value Index.

Composition: Companies whose book-to-market ratio falls in the top 20 percent of U.S. large-cap companies after the exclusion of utilities, companies lacking financial data and companies with negative book-to-market ratio. The eligible market is composed of securities of U.S. companies traded on the NYSE, AMEX and Nasdaq Global Market.

### US Market Equity — Risk Targets 2 and 3

Courtesy of DFA.

January 1973–present:

DFA US Adjusted Market 2 Index.

### US Large Cap Value

Courtesy of DFA.

January 1973–present:

DFA US Large Cap Value Index.

### US Small Cap Value

Courtesy of DFA.

January 1973–present:

DFA US Targeted Value Index.

## International Equities

### Fama-French International Value Index

Courtesy of Morgan Stanley Capital International (MSCI) and Fama-French.

January 1973–December 1974:

Data provided by MSCI EAFE Index (net dividends).

January 1975–present:

Data provided by Fama-French from MSCI securities data. Simulated strategy of MSCI EAFE countries in the upper 30 percent book-to-market range.

### Dimensional International Small Cap Index

Courtesy of DFA.

January 1970–June 1981:

50 percent Hoare Govett Small Companies Index.

50 percent Nomura Small Companies Index.

July 1981–present:

Simulated by DFA from Style Research securities data.

Includes securities of MSCI EAFE countries in the bottom 10 percent of market capitalization, excluding the bottom 1 percent.

Sources and descriptions of data supplied by Dimensional Fund Advisors. Information from sources deemed reliable, but its accuracy cannot be guaranteed.

# Sources and Descriptions of Data

## International Market Equity

Courtesy of MSCI, DFA and Fama-French.

January 1973–December 1974:	50 percent MSCI EAFE (net dividends). 50 percent DFA International Small Cap Index.
January 1975–June 1981:	35 percent MSCI EAFE (net dividends). 28 percent Fama-French International Value Index. 37 percent DFA International Small Cap Index.
July 1981–present:	35 percent MSCI EAFE (net dividends). 28 percent Fama-French International Value Index. 32 percent DFA International Small Cap Index. 5 percent DFA International Small Cap Value Index.

## International Large Value

Courtesy of MSCI, DFA and Fama-French.

January 1973–December 1974:	50 percent MSCI EAFE (net dividends). 50 percent DFA International Small Cap Index.
January 1975–present:	Fama-French International Value Index.

## International Small Value

Courtesy of DFA.

January 1973–June 1981:	DFA International Small Cap Index.
July 1981–present:	DFA International Small Cap Value Index.

## Emerging Market Equity

Courtesy of MSCI, DFA and Fama-French.

January 1973–December 1974:	25 percent MSCI EAFE (net dividends). 75 percent DFA International Small Cap Index.
January 1975–December 1987:	50 percent Fama-French International Value Index. 50 percent DFA International Small Cap Index.
January 1988–December 1988:	MSCI Emerging Markets Index (gross).
January 1989–present:	50 percent MSCI Emerging Markets Index (gross). 25 percent Fama-French Emerging Markets Small Cap Index. 25 percent Fama-French Emerging Markets Value Index.

## Fixed Income

### Barclays Capital Government/Credit Bond Index

Range 1–30+ years. Courtesy of Barclays Capital.

### Barclays Capital Intermediate Government Credit Bond Index

Range 1–10 years. Courtesy of Barclays Capital.

### Six-Month Treasury Bills

Courtesy of CRSP and Merrill Lynch.

January 1964–December 1977:	CRSP.
January 1978–present:	Merrill Lynch G002 Index.

### One-Year Treasury Note Index

Courtesy of CRSP, DFA and Merrill Lynch.

July 1963–May 1991:	CRSP/DFA.
June 1991–June 2000:	Merrill Lynch One-Year US Treasury Bill Index.
July 2000–present:	Merrill Lynch One-Year US Treasury Note Index (GC03 Index).

### One-Month Treasury Bills (Average maturity: 30 days), Five-Year Treasury Notes, Long-Term Government Bonds (Average maturity: 20 years) and Long-Term Corporate Bonds

Courtesy of Roger G. Ibbotson and Rex A. Sinquefeld, *Stocks, Bonds, Bills and Inflation: The Past and the Future*, Dow Jones, 1989. Ibbotson Associates, Chicago, annually updates work by Roger G. Ibbotson and Rex A. Sinquefeld. Used with permission. All rights reserved.

### One-Month Certificate of Deposit

Courtesy of Federal Reserve Bank.

January 1966–present:	One-Month Certificate of Deposit Index.
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### Three-Month Certificate of Deposit

Courtesy of Federal Reserve Bank.

January 1988–present:	Three-Month Certificate of Deposit Index.
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## Six-Month Certificate of Deposit

Courtesy of Federal Reserve Bank.

January 1988–present:	Six-Month Certificate of Deposit Index.
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## Merrill Lynch Three-Month US Treasury Bill Index

Courtesy of Merrill Lynch.

January 1978–present:	Merrill Lynch Three-Month US Treasury Bill Index.
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## Barclays Capital US Government Bond Index (Intermediate)

Courtesy of Barclays Capital.

January 1973–present:	Barclays Capital Intermediate Government Bond Index.
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## Barclays Capital Treasury Bond Index (Intermediate)

Courtesy of Barclays Capital.

January 1973–present:	Barclays Capital Intermediate Treasury Bond Index.
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## Barclays Capital Credit Bond Index (Intermediate)

Range 1–10 years. Courtesy of Barclays Capital.

January 1973–present:	Barclays Capital Intermediate Credit Bond Index.
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## Barclays Capital Treasury Bond Index

Range 1–30+ years. Courtesy of Barclays Capital.

January 1973–present:	Barclays Capital Treasury Bond Index.
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## Barclays Capital US Government Bond Index

Range 1–30+ years. Courtesy of Barclays Capital.

January 1973–present:	Barclays Capital Government Bond Index.
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## CSFB High Yield Index

Courtesy of Morningstar.

January 1988–present:	CSFB High Yield Index.
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## Fixed Income for Risk Target 3 2008 Indexes

Courtesy of Merrill Lynch, Citigroup and Barclays Capital.

January 1973–December 1989:	Merrill Lynch One-Year US Treasury.
January 1990–February 1997:	Citigroup World Government Bond (1–3 Hedged).
March 1997–present:	50 percent Citigroup World Government Bond (1–3 Hedged). 50 percent Barclays Capital TIPS Index.

## Hard Assets

### Dow Jones Wilshire REIT Index

Courtesy of Dow Jones Wilshire.

January 1978–present:	Dow Jones Wilshire REIT Index.
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### S&P Goldman Sachs Commodities Index™

Courtesy of Bloomberg.

January 1970–present:	S&P Goldman Sachs Commodities Index™
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## Inflation

Courtesy of Roger G. Ibbotson and Rex A. Sinquefeld, *Stocks, Bonds, Bills and Inflation: The Past and the Future*, Dow Jones, 1989. Ibbotson Associates, Chicago, annually updates work by Roger G. Ibbotson and Rex A. Sinquefeld. Used with permission. All rights reserved.

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