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AN EVOLUTIONARY APPROACH TO PORTFOLIO CONSTRUCTION

Anthony B. Davidow, CIMA®

Vice President, Alternative Beta and Asset Allocation Strategist, Schwab Center for Financial Research®

Schwab believes that asset allocation and portfolio construction needs to evolve to meet the needs of investors. This paper will discuss the evolution of asset allocation and portfolio construction principles and will offer our unique point of view. We will consider the "active" versus "passive" debate and suggest a new way of incorporating both types of strategies.

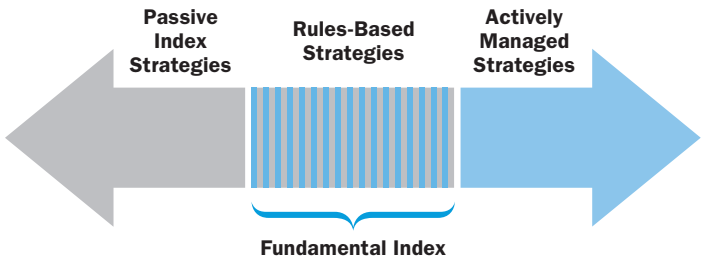
In this paper:

We will evaluate the historical data and discuss which types of market regimes fundamental strategies would have performed best in, and when they tend to lag the market-cap-weighted indexes. The following are a few of the key findings of our research:

- Fundamental strategies have historically delivered better risk-adjusted results than their market-cap equivalents.
- Fundamental strategies have historically been able to outperform market-cap indexes and most active mutual funds.
- Many active mutual funds have had difficulty in consistently outperforming market-cap indexes.
- Active managers may be able to generate excess returns and provide downside protection, but manager selection requires dedicated resources to properly evaluate the available options.
- Our research has shown that combining **active**, **market-cap**, and **fundamental** strategies in an optimal fashion helps reduce the overall portfolio risk.

We will discuss the merits of fundamentally weighted strategies and how to combine them with active and traditional market-cap-weighted strategies. Fundamental strategies are also referred to as *alternative beta*, *strategy beta*, or *smart beta* because they weight securities based on fundamental factors rather than merely providing the biggest weights to the largest companies. With the proliferation of ETFs and the introduction of alternative beta strategies, there are now more options in gaining exposure to market segments.

The focus of the paper is on providing guidance on building better portfolios. We will discuss the *art* and *science* of portfolio construction, using behavioral science and historical data to build portfolios. We will share proprietary research conducted by Schwab and offer insights on modern portfolio construction techniques and implementation strategies.



We believe that advisors should consider strategies along a continuum. Passive (cap-weighted) strategies are designed to provide cheap beta, while active strategies seek to generate excess return (alpha). Fundamental strategies belong somewhere between passive and active. They apply a rules-based discipline that establishes the criteria for selecting, weighting, and rebalancing securities. These strategies are neither truly passive nor active.

Schwab Center for Financial Research® (SCFR) believes that rather than determining whether it is preferable to allocate to active or passive options, there is a more evolved view of how to employ both in portfolios. In fact, we will demonstrate the value of incorporating active, traditional beta and alternative beta strategies in client portfolios.

Academic Research and Investment Theory

The basic tenets of modern portfolio theory (MPT) were developed in the 1950s and 1960s. Harry Markowitz introduced the concept of portfolio diversification in 1952,[1] and Bill Sharpe introduced the capital asset pricing model (CAPM) in 1964.[2] Both would eventually win Nobel Prizes for their work. MPT wasn't broadly adopted until the 1990s as institutions and individual investors began to develop asset allocation strategies.

In 1986, Gary Brinson published "Determinants of Portfolio Performance" in *Financial Analysts Journal*. The study suggested that "90% of a portfolio's change in returns over time is attributable to asset allocation policy."[3] This was a significant step forward and helped shape investment theory. Investors began to focus their energies on developing the optimal combination of asset classes (also referred to as the *efficient frontier*).

To develop asset allocation models, institutions and consultants began to use the traditional market-cap-weighted indexes as market proxies. It's important to note that the original market-cap indexes were never designed to be investable products. They were designed to be benchmarks to assist managers and institutions in measuring success. Investors could gauge the performance of one market segment versus another (S&P 500 Index vs. Russell 2000

1. Harry Markowitz, "Portfolio Selection," *Journal of Finance*, Vol. 7, No. 1, March 1952, 77–91.
2. William Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," *Journal of Finance*, Vol. 19, No. 3, Sept. 1964, 425–42.
3. Gary Brinson, Randolph Hood, and Gilbert Beebower, "Determinants of Portfolio Performance," *Financial Analysts Journal*, Vol. 42, No. 4, July–Aug. 1986, 39–44.

Index vs. MSCI EAFE Index), or investment managers could compare their results relative to benchmarks and measure their value added.

The efficient market hypothesis (EMH) states that it is impossible to "beat the market" because the markets are efficient, and all known information is reflected in stock prices. According to the EMH, stocks always trade at their fair value, making it impossible for investors to make money buying or selling stocks. As such, it should be impossible to outperform the overall market through stock selection or market timing, and the only way an investor can possibly obtain higher returns is by purchasing riskier investments. Although initially accepted, many critics began to challenge the EMH.

In 1973, Burton Malkiel wrote *A Random Walk Down Wall Street*, in which he claimed that a chimpanzee throwing darts could do as well as a professional in beating the market. His assumption was that the market was efficient, and therefore nobody could consistently outperform the market. Of course, this was long before the birth of alternative weighting methodologies.

Many academics have challenged the EMH since it became popular in the 1970s. In particular, critics have challenged the efficacy of EMH in periods of "bubbles." As Robert Shiller has noted, "The fundamental value of stocks is hard to measure, and, moreover, if speculative bubbles (either positive bubbles or negative bubbles) last a long time, then even the fundamental relation may not be observed except in very long sample periods."[4] Unfortunately, we have experienced a number of shocks in recent years, and have seen both "irrational exuberance" in the late 1990s and fear and pessimism in the post–2008 financial crisis period.

After the 2008 financial crisis, advisors began to challenge the merits of MPT. They pointed to the higher correlations during periods of market stress, and experienced diminished diversification benefits when they needed them the most. Advisors contended that MPT needed to evolve to reflect the new market realities and respond to "tail risk." MPT assumes a normal distribution of returns and will underestimate the true value for tail risk due to fat tails in financial data.

Post-modern portfolio theory (PMPT) represents an evolutionary step forward. MPT defined risk as the standard deviation of returns. PMPT uses the standard deviation of negative returns as the measure of risk. MPT assumes that risks are symmetrical, whereas PMPT assumes asymmetrical risk. Downside risk captures what investors fear most—**negative returns**. We will discuss investors' attitude of risk later in the paper. We believe that PMPT, a more evolved view of investment theory, shows us how we need to challenge conventional wisdom to seek better outcomes.

Academic theory has evolved a great deal over the years. MPT provided some basic frameworks for allocating assets. With the expansion of asset classes and the number of ways to gain exposure, investors need to evolve their allocation process. We must learn from history and adopt a more informed and forward-looking approach to allocating assets.

Active and Passive

For many years, academics and investors have debated whether active or passive management represented a better way of investing. Active managers will claim skill and insights not readily available in the marketplace. They will point to their abilities to analyze balance sheets and find an edge in understanding a company's growth potential.

Critics will point to the data showing the inability of active managers to consistently generate alpha. Many point to the exceptional growth of ETFs as a realization that managers are not worth the additional fees. A growing number of advisors have embraced ETFs as better building blocks for portfolio construction. With the growth in the

4. Robert Shiller, "From Efficient Markets to Behavioral Finance," *Journal of Economic Perspectives*, Vol. 17, No. 1, Winter 2003, 83–104.

number of ETFs, investors now have multiple choices in gaining market exposure.

We believe there is a role for both active and passive investment options. We understand that active managers have had difficulties in generating consistent alpha; however, we also know that some managers have outperformed in rising markets and protected better in falling markets. There are some exceptional managers and some mediocre managers. There are managers who have consistently outperformed their benchmarks and peers. The challenge, of course, is to find them.

Manager selection—the ability to find the superior managers—requires skills and resources. Advisors need to be able to analyze historical data and make a judgment about the manager's ability to generate similar results in the future. There are a number of valuable tools to assist in the screening and evaluation of manager results. We recognize that investors need to devote time and energy to identify the skillful managers and carefully monitor those results over time. Investors may choose to hire someone with the skills, resources, and acumen to identify managers on their behalf.

Fortunately, there are numerous active and passive investment options readily available in the market. The explosive growth in ETFs allows investors to gain exposure to virtually every market segment, as well as different index construction methodologies (market cap and fundamental weight). A plethora of mutual fund and separately managed account (SMA) options present both challenges and opportunities. The table below compares some of the features of **active**, **market-cap**, and **fundamental** weighted strategies.

We understand that not all advisors have the skills and resources to appropriately evaluate managers, and therefore may choose to cede the argument and utilize passive options. Active and passive options have their pros and cons. We believe that investors should evolve their views and embrace both types of strategies.

Alternative Beta

A lot of academic research challenges the notion that traditional market-cap-weighted indexes are the most appropriate market benchmark. In fact, much of the research shows that fundamental strategies have outperformed their cap-weighted counterparts over longer intervals. Fundamental indexes screen securities based on fundamental factors like adjusted sales, retained cash flow, and dividends + buybacks, and then weight securities based on these factors. Traditional market-cap indexes weight securities based on market capitalization. In other words, the largest companies by market capitalization would have the largest weight in an index.

Rob Arnott and his colleagues at Research Affiliates® have championed the use of fundamental indexing for many years. In an article published in *Financial Analysis Journal*, Arnott et al. criticize CAPM and some of the assumptions used, most notably the use of cap-weighted indexes as the market benchmark. Based on their research, Research Affiliates has shown significant outperformance relative to traditional indexes: "We believe these results are not mere accidents of history but are likely to persist into the future. The mean-variance superiority of the fundamental indexes is robust and significant."[5]

	Active	Market Cap	Fundamental
Portfolio Weighting	Varies by manager	Cap-weighted	Factor-based
Portfolio Construction	Varies by manager	Larger-cap bias	Value-tilt
Portfolio Turnover	Buy and sell discipline	Reconstitution	Rebalancing
Tax Efficient	Not typically	Typically	Typically
Cost Structure	Varies by manager and vehicle	Lowest cost	Low cost

5. Robert D. Arnott, Jason C. Hsu, and Philip Moore, "Fundamental Indexation," *Financial Analysts Journal*, Vol. 61, No. 2, March–April 2005, 83–97.

Arnott may have started the debate, but others have joined in the discussion, leading to the introduction of multiple fundamental index strategies. According to Nöel Amenc, "[T]he reason behind the new indices for the vast majority of investors, and doubtless their promoters, is probably the superiority of their performance compared to traditional cap-weighted indices. Alternative beta, advanced beta or smart beta are therefore a response from the market to a question that forms the basis of modern portfolio theory since the work of Harry Markowitz: how to construct the optimal portfolio."[6]

Exhibit 1 shows the top 10 holdings in the Russell 1000 Index and the Russell Fundamental U.S. Large Cap Index. While many of the companies appear in both, the weights can be quite different. As you can see, Apple is the largest position in the Russell 1000 Index based on the fact that it is the largest company by market capitalization. Conversely, Exxon is the largest position in the Russell Fundamental Index. This is due to its strong sales, cash flow, and dividend payment characteristics.

As noted below, Apple is the largest company in the Russell 1000 Index, and isn't even in the top 10 largest in the Russell Fundamental Index (as of Dec. 31, 2012, Apple was the 51st-largest company in the Russell Fundamental Index). Through the first three quarters of 2012, Apple was up over 65%. Fundamental indexes and most active managers underweighted Apple, making it very difficult to outperform. Market-cap weighting generally performs better in market environments that reward mega-cap stocks due to their overweighting of the largest companies, and often outperforms in "boom" periods (for instance, during the tech bubble).

Unlike market-cap strategies that tend to overweight the overvalued stocks and underweight the

EXHIBIT 1

Russell Fundamental U.S. Large Company Index

Company	Weight
ExxonMobil Corp.	5.19%
Chevron Corp.	2.56%
Bank of America Corp.	2.05%
AT&T Inc.	2.02%
ConocoPhillips	1.74%
General Electric Co.	1.64%
Proctor & Gamble Co.	1.60%
Microsoft Corp.	1.53%
Wal-Mart Stores Inc.	1.48%
Verizon Communications Inc.	1.39%
Total	**21.20%**

Russell 1000 Index

Company	Weight
Apple Inc.	3.43%
ExxonMobil Corp.	2.78%
General Electric Co.	1.53%
Chevron Corp.	1.47%
International Business Machines Corp.	1.44%
Microsoft Corp.	1.38%
AT&T Inc.	1.36%
Johnson & Johnson	1.32%
Pfizer Inc.	1.29%
Procter & Gamble Co.	1.28%
Total	**17.28%**

Source: Russell Investments and Research Affiliates® (as of Dec. 31, 2012).

6. Nöel Amenc, "Beyond Smart Beta Indexation," *Edhec-Risk Indices and Benchmarks*, Nov. 2012, http://www.edhec-risk.com/edito/RISKArticle-Edito.2012-11-29.5604.

undervalued stocks, fundamental strategies weight securities based on predetermined factors. As shown in Exhibit 1, fundamental strategies will have different weights than their market-cap counterparts. In certain market environments, the differences will become pronounced and can lead to dramatically different client experiences. For example, since Apple is the largest company in the Russell 1000 Index, the rise and fall of Apple will have a larger effect on the overall index performance than the fundamental strategy. Fundamental indexes may also have a small-cap tilt.

We believe that it is important for investors to understand the differences between fundamental and traditional market-cap-weighted strategies and understand how each strategy performs in a given market environment. Previously, we covered differences in the construction methodologies.

We believe that both provide value, and each will deliver different results depending on the market environment. Although over longer intervals fundamental indexes have been able to deliver excess returns, there are environments in which market-cap-weighted strategies will generate better results.

As referenced in Exhibit 2, fundamental indexes have generally outpaced traditional indexes over the long run. The excess returns ranged from a low of 1.8% for the Russell Fundamental Developed ex U.S. Small Company Index to a high of 6.5% excess return for the Russell Fundamental Emerging Markets Large Company Index. However, we should also point out that they also exhibit higher tracking errors relative to the cap-weighted index. The Russell Fundamental Emerging Markets Index had an 8% tracking error versus the Russell Emerging Markets.

EXHIBIT 2
(1996–2012)

	Return	Excess	Volatility	Sharpe Ratio	Tracking Error	Information Ratio
Russell Fundamental U.S. Lg	10.1%		15.7%	0.48		
Russell 1000	7.2%	2.9%	16.4%	0.28	5.8%	0.50
S&P 500	6.9%	3.1%	16.2%	0.27	5.6%	0.56
Russell Fundamental U.S. SM	13.3%		19.4%	0.55		
Russell 2000	7.6%	5.7%	21.0%	0.24	7.8%	0.72
Russell Fundamental Dev x U.S. Lg	8.6%		17.6%	0.34		
Russell Large Cap Developed x U.S.	5.8%	2.8%	17.8%	0.18	4.2%	0.66
MSCI EAFE Lg	4.5%	4.0%	17.8%	0.11	4.6%	0.87
Russell Fundamental Developed ex U.S. Small Company	8.0%		17.5%	0.31		
Russell Small Cap Developed x U.S.	6.2%	1.8%	18.2%	0.20	5.1%	0.34
Russell Fundamental Emerging Markets Large Company	14.2%		26.0%	0.45		
Russell Emerging Markets	7.7%	6.5%	25.7%	0.20	8.0%	0.82

Source: Research Affiliates, LLC, based on data from Russell Investments and Bloomberg. The Russell Fundamental Indexes were created on 2/24/11. Performance and statistical data on Russell Fundamental Indexes for periods prior to each index's inception is back tested, but was calculated in the same manner as more recent, factual index data. The performance information presented represents back-tested performance based on combined simulated data and live from 8/01/1996 to 12/31/2012. Back-tested performance is hypothetical, done with the benefit of hindsight, and is provided for informational purposes only to indicate historical performance had the stocks actually been invested in over the relevant time period. Commissions and other fees were not taken into consideration; if they had been, performance would have been substantially lower.

Fundamental indexes are created based on economic factors. Market-cap indexes weight securities by market capitalization, and they are disproportionately affected by the price movements of the biggest companies in the index. Market-cap indexes have a larger-cap bias. Since fundamental indexes tend to screen securities based on value factors, they introduce a value bias. However, it is important to note that fundamental indexes are *not* value indexes. Fundamental indexes will own value, growth, and core stocks depending on their fundamental characteristics. Value indexes will screen securities to identify value stocks and then typically weight them based on market capitalization.

Fundamental indexes have generally outpaced traditional indexes over the long run. The excess returns ranged from a low of 1.8% for the Russell Fundamental Developed ex U.S. Small Company to a high of 6.5% excess return for the Russell Fundamental Emerging Markets Large Company.

SCFR evaluated the sources of outperformance to determine whether they were sustainable over time. The two primary sources of excess return came from the value-tilt, favoring value factors in screening securities and disciplined rebalancing. The source of alpha comes from the *dynamic value effect* and is realized through the rebalancing process. Rebalancing allows a fundamental index to capitalize on price movements without deviating from its rules-based discipline.

Active Manager Selection

As previously discussed, it is challenging to find managers that can consistently outperform their benchmarks. While there are superior managers that have outperformed in rising markets and protected better in falling markets, it requires dedication and resources to do it well. However, there are managers who earn their fees by beating their benchmarks.

S&P Indices has created a Persistence Scorecard to track the consistency of top-performing mutual funds over rolling time periods. Working with the University of Chicago's Center for Research in Security Prices (CRSP) Survivor-Bias-Free US Mutual Fund Database, the Persistence Scorecard ranks all funds available at each point in time and tracks the top-quartile and top-half performers throughout the time period. In their December 2012 report "Does Past Performance Matter?"[7] they note that very few funds manage to consistently stay at the top. Of the 707 funds that were in the top quartile as of September 2010, only 10% were still in the top quartile at the end of September 2012. For the three years ending September 2012, 23.60% of large-cap funds, 15.49% of mid-cap funds, and 29.37% of small-cap funds maintained a top-half ranking over three consecutive 12-month periods.

Part of the difficulty in consistently outperforming is the natural rotation that occurs in the market. There is a rotation from growth to value and a rotation among the types of value and growth managers that perform well in a given market environment. Active manager selection requires advisors to understand the types of managers that perform well in a given market environment.

There are tools that can assist in screening manager data over multiple time periods. These tools can assist in evaluating managers' absolute

7. Aye Soe and Frank Luo, "Does Past Performance Matter?: The Persistence Scorecard" S&P Dow Jones Indices, Dec. 2012.

and relative results versus their benchmarks and peer groups. They can allow investors to measure a myriad of risk statistics, including alpha, beta, standard deviation, Sharpe ratio, Sortino ratio, capture ratio, and information ratio. By analyzing data over multiple time periods, advisors can determine the consistency of results.

Many advisors also evaluate qualitative factors and often conduct due diligence on such factors as the organization and ownership structure, assets under management growth, strategy capacity, trading practices, contingency plans, compliance, and operations. The due diligence can be conducted via questionnaires and onsite visits. The goal of the evaluation is to determine the soundness and repeatability of the investment process, as well as the ability to handle growth in the strategy. Poor performance is often a symptom of a larger organization issue, such as deviation from stated discipline, loss of key personnel, exceeding capacity thresholds, and changes in ownership structure.

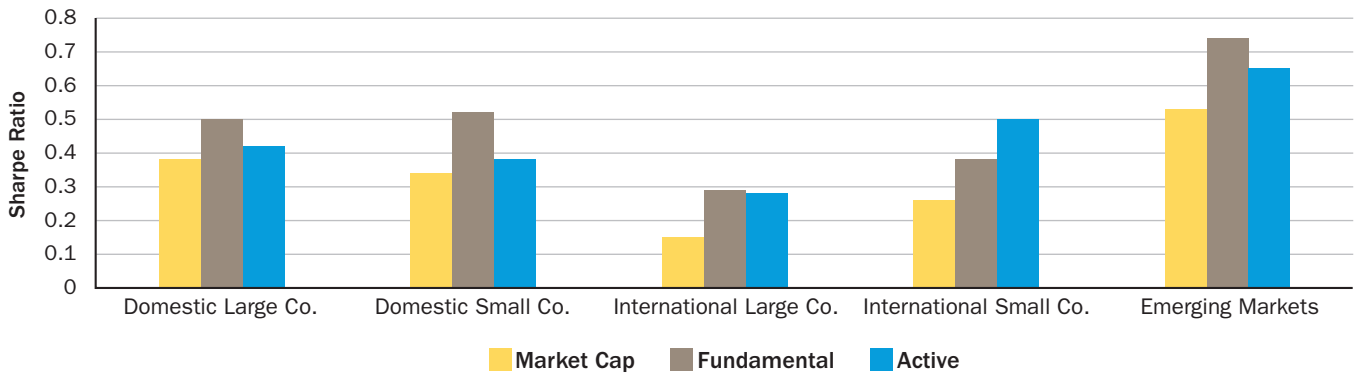
Building Better Portfolios

As previously discussed, SCFR believes in the value of combining active and passive investment options. We also believe that investors will have a different experience with market-cap and fundamentally weighted strategies. We believe that asset allocation strategies need to be integrated into sound portfolio construction techniques. Therefore, we wanted to evaluate the best way of incorporating these types of strategies in an integrated portfolio.

In evaluating allocations among active, market-cap, and fundamental investment options, we wanted to look at the risk-adjusted results across multiple market segments. We compared active, market-cap, and fundamental strategies across the major equity segments: domestic large cap, domestic small cap, international large, international small, and emerging markets.

For the active option, we used our internal rating system and screened our 'A'- and 'B'-rated managers.

EXHIBIT 3
Sharpe Ratio



Source: Charles Schwab Investment Advisory. The performance information presented represents back-tested performance based on combined simulated data and live from 1/1992 to 5/2012 for Domestic Large Co., Domestic Small Co., and International Large Co., 1/2004–5/2012 for International Small Co., and 1/2002–5/2012 for Emerging Markets. Back-tested performance is hypothetical, done with the benefit of hindsight, and provided for informational purposes only to indicate historical performance had the stocks actually been invested in over the relevant time period. Commissions and other fees were not taken into consideration; if they had been, performance would have been substantially lower.

The rating system is based on a proprietary model that rates 16,000 open-end mutual funds based on their relative performance prospects for the next 12–36 months. The ratings combine risk and return data with other fund attributes to create a unified rating. For this exercise, we ranked the 'A' and 'B' funds by their downside correlation (i.e., downside capture ratio relative to the appropriate benchmark). We then selected the top 10% of funds exhibiting the best downside correlation. Each fund was equal-weighted, and at the end of every year we reranked the funds and repeated the process. The results are reflected in our analysis below.

Exhibit 3 shows the Sharpe ratios of the active, fundamental, and market-cap indexes across multiple asset classes. Note that the fundamental strategies have generally provided the best Sharpe ratios. The exception is international small cap, where the active managers delivered the highest Sharpe ratio. It seems intuitive that active managers should be able to demonstrate skill in the less efficient markets.

In considering portfolio construction options across active and passive options, we wanted to evaluate the options through a common lens. We have compared the active, fundamental, and market-cap-weighted index options with the comparable Morningstar Universe. The data in Exhibit 4 compares the Russell Large Cap Fundamental Index and the S&P 500 with the Morningstar Large Cap Universe. This comparison allows us to evaluate the market-cap and fundamental options relative to a broad universe.

As shown in Exhibit 4, the Russell Fundamental U.S. Large Cap Index delivered significant excess return relative to its cap-weighted equivalent (9.19% vs. 6.60%). The fundamental index delivered an attractive upside/downside capture ratio (101.84/99.63), outperforming in rising markets and protecting better in falling markets. The Fundamental Index generated an impressive alpha, Sharpe ratio, and information ratio. Our research has shown similar results as we evaluate fundamental strategies across other market segments (e.g., domestic small cap, international large cap, international small cap, and emerging markets).

Portfolio Construction

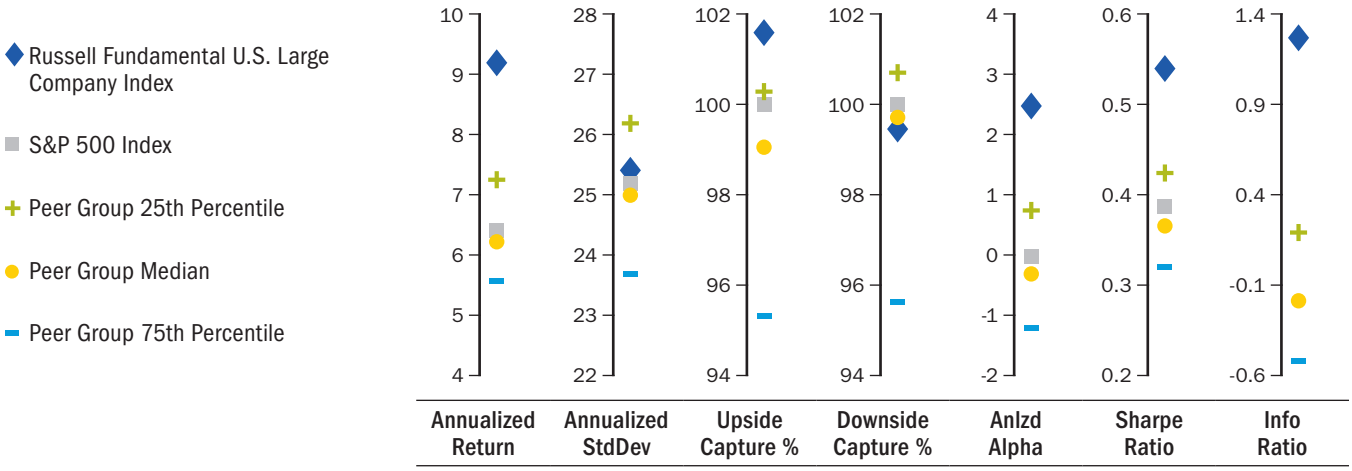
MPT provides a theoretical framework for allocating assets but provides little guidance on the practical implications of portfolio constructions. Portfolio construction incorporates asset allocation theory and strategies to gain exposure to the asset classes. Portfolio construction requires advisors to evaluate different strategies and structures to determine the right combination of solutions to meet investor needs and objectives.

We believe that portfolio construction requires both art and science. We have already shared analysis on active, fundamental, and traditional market-cap-weighted indexes. We now want to consider behavioral finance and how investors react to risk. Daniel Kahneman and Amos Tversky have studied how people respond to risk. Their research on prospect theory serves as a factor in our portfolio construction process.

One very important result of Kahneman and Tversky's work is demonstrating that people's attitudes toward risks concerning gains may be quite different from their attitudes toward risks concerning losses. For example, when given a choice between getting $1,000 with certainty or having a 50% chance of getting $2,500, they may well choose the certain $1,000 in preference to the uncertain chance of getting $2,500 even though the mathematical expectation of the uncertain option is $1,250. This is a perfectly reasonable attitude that is described as risk aversion.[8]

8. Daniel Kahneman and Amos Tversky, "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica,* Vol. 47, No. 2, March 1979, 263–92.

EXHIBIT 4
Universe Comparison (2003–2012)



As of 12/31/2012	Annualized Return	Annualized StdDev	Upside Capture %	Downside Capture %	Anlzd Alpha	Sharpe Ratio	Info Ratio
Russell Fundamental U.S. Large Index	9.19	25.19	101.84	99.63	2.42	0.53	1.33
S&P 500 Index	6.60	25.03	100.00	100.00	0.00	0.39	—
Peer Group 25th Percentile	7.14	26.24	101.31	101.29	0.69	0.44	0.13
Peer Group Median	6.26	25.05	99.38	99.98	-0.33	0.37	-0.17
Peer Group 75th Percentile	5.49	23.78	95.46	95.71	-1.12	0.32	-0.50
Peer Group 95th Percentile	3.97	15.91	82.99	82.37	-3.51	0.17	-1.41

Peer Group: Morningstar Category Large Blend. Number of investments ranked: 1,206. The performance information presented represents back-tested performance based on combined simulated data and live through 12/31/12. Back-tested performance is hypothetical, done with the benefit of hindsight, and is provided for informational purposes only to indicate historical performance had the stocks actually been invested in over the relevant time period. Commissions and other fees were not taken into consideration; if they had been, performance would have been substantially lower.

Prospect theory suggests that investors react very differently to losses. It suggests that investors strongly favor avoiding losses rather than seeking gains. In fact, investors favor loss aversion twice as much as seeking gains. We have factored loss aversion into our portfolio recommendations.

In providing portfolio construction recommendations, we considered three levers to determine the optimal blend of active, market-cap, and fundamental index options: *loss aversion*, *tracking error*, and *alpha*. The following table provides a summary of the considerations:

Key Lever	Market Cap	Fundamental	Active
Tracking error	No tracking error	High tracking error	Medium tracking error
Loss aversion	No downside protection	No downside protection	Provides potential downside protection
Alpha	No alpha	Alpha	Varies

Market cap experiences little or no tracking error (fees could provide a small drag), no downside protection, and no alpha. Market-cap strategies, index funds, and ETFs provide beta exposure. With the proliferation of ETFs, there are cost-effective ways of capturing beta. While **fundamental** strategies have historically delivered alpha, they have a relatively high tracking error relative to the market-cap strategies. **Active** managers seek to deliver alpha and may provide downside protection, but they also likely exhibit a medium tracking error.

Depending on investors' sensitivity to the levers noted above, they could overweight or underweight their allocations across active, market cap, or fundamental. In fact, investors unconcerned about tracking error and lacking the skills and resources to evaluate active options may determine that the best allocation would be to fundamental strategies. Conversely, if a firm had significant resources dedicated to finding superior active managers, investors could choose to allocate a larger percentage to active.

As discussed above, we believe that active, market-cap, and fundamental index strategies each have their own investment merits. We point out that there are pros and cons associated with each. We believe that portfolio construction is both art and science. For the most efficient markets, you could choose to allocate more of a client's portfolio to passive strategies; for the less efficient markets (e.g., international small cap or emerging markets), you could justify allocating more to skillful active managers.

Exhibit 5 provides a sample portfolio allocation across active, market-cap, and fundamental strategies. Since the large-cap domestic market is relatively efficient, we have allocated 80% of the portfolio to passive strategies, with 50% allocated to fundamental due to the alpha-generating characteristics. For the international large-cap portfolio, we allocated 50% to active and 50% to passive. We would recommend allocating a higher percentage to skillful active managers in the emerging market portfolio.

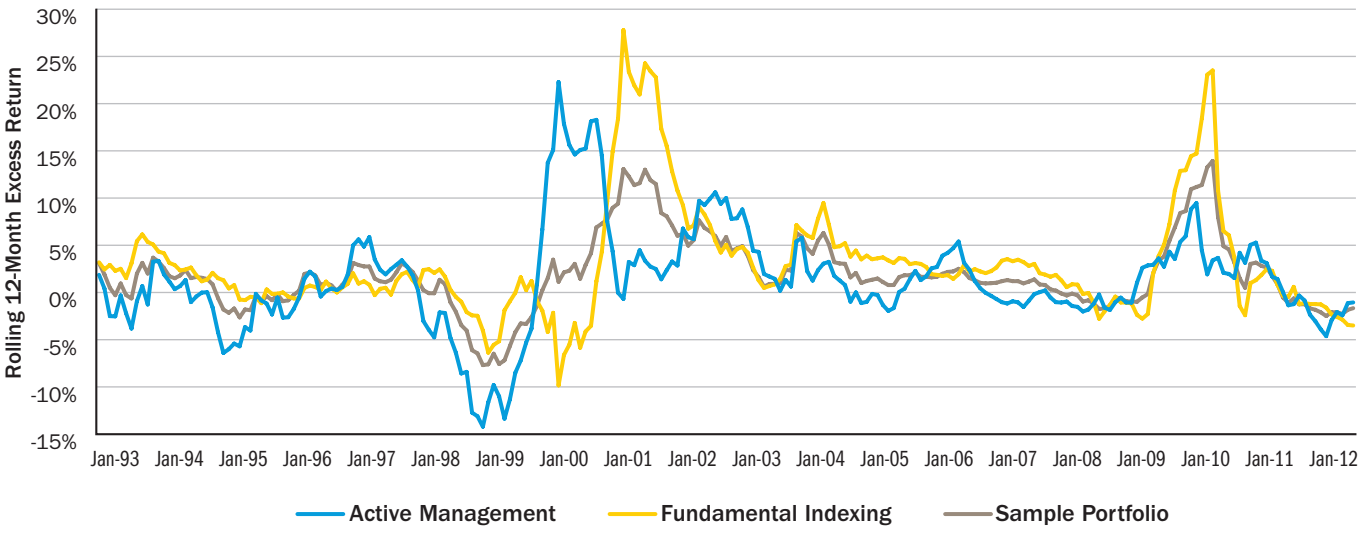
EXHIBIT 5
Sample Portfolio

	Domestic Large	Domestic Small	International Large
Market Cap	30%	25%	20%
Fundamental	50%	50%	30%
Active With Downside	20%	25%	50%
% Passive (MC+FI)	80%	75%	50%

For illustrative purposes only.

EXHIBIT 6

Rolling 12-Month Excess Return vs. Market Cap Benchmark



	Excess Return	Excess Risk	Excess Sharpe Ratio	Excess Max Drawdown
Fundamental	2.19%	2.56%	0.08%	2.30%
Active With Downside	0.69%	0.04%	0.04%	-2.20%
Sample Portfolio	1.24%	0.97%	0.05%	0.20%

Source: Charles Schwab Investment Advisory. The sample portfolio is the same as the sample portfolio in Exhibit 5. The performance information presented represents back-tested performance. Back-tested performance is hypothetical, done with the benefit of hindsight, and is provided for informational purposes only to indicate historical performance had the stocks actually been invested in over the relevant time period. Commissions and other fees were not taken into consideration; if they had been, performance would have been substantially lower.

In order to test the portfolio allocations, we compared the results of the sample portfolio with the market-cap benchmark. We analyzed the rolling 12-month excess return relative to the benchmark (Exhibit 6). The sample portfolio provided more stable excess returns than either the active or fundamental indexing returns over time. The data also shows that there were periods when active, market-cap, and fundamental indexing outperformed and underperformed. We believe the combination provides a better portfolio, reducing the volatility over time while still participating in market appreciation.

The above data highlights some of the relevant risk and return characteristics of the fundamental, active, and sample portfolios. The sample portfolio provides favorable risk-return characteristics. As previously mentioned, investors could choose to modify the allocations across active, market-cap, and fundamental strategies. They could alter the risk and return profile based on the percentage allocated to each. Based on our analysis, we believe that combining these strategies provides better risk-adjusted results and better client experience.

Conclusion

Modern portfolio theory provides a theoretical framework for allocating assets. With the development of new and innovative strategies in easy-to-access structures, advisors have more options at their disposal. Advisors can select from a multitude of investment options in various structures. ETFs have made it easier for advisors to access market segments and allocate assets.

Schwab believes that active, market-cap, and fundamental strategies can be used together in building portfolios.

Investment theory and application need to evolve to reflect the new realities. Investing today is more complex and requires more attention to details than at any time in recent history. Investors need to evaluate the various structures and strategies to determine the best way of gaining market exposure. Asset allocation and portfolio construction need to be part of an integrated investment plan and need to be monitored over time.

Investors should move beyond the active versus passive debate and embrace the merits of each type of strategy. Fundamental indexing represents an evolutionary step forward. Fundamental strategies have historically delivered excess returns relative to their cap-weighted equivalent. Because of their factor-oriented construction process, they are often referred to as *alternative beta* or *smart beta* strategies. Fundamental strategies can be used as a complement to traditional market-cap and active strategies.

Schwab believes that active, market-cap, and fundamental strategies can be used together in building portfolios. We believe that portfolio construction should be a combination of art and science, utilizing behavioral finance, historical data, and financial intuition. Our research shows that constructing portfolios in an optimal fashion provides better risk-adjusted results and a smoother ride for investors.

Glossary of Terms

Alpha. A performance measure on a risk-adjusted basis. Alpha takes the volatility (risk) of a mutual fund, or other type of investment, and compares its risk-adjusted performance with a benchmark index. The excess return of the fund relative to the return of the benchmark index is a fund's alpha.

Beta. A measure of the volatility, or systematic risk, of a security or a portfolio in comparison with the market as a whole. Beta is used in the capital asset pricing model (CAPM), a model that calculates the expected return of an asset based on its beta and expected market returns.

Capture ratio. A statistical measure of an investment manager's overall performance in up and down markets. The up-market capture ratio is used to evaluate how well an investment manager performed relative to an index during periods when that index has risen. The ratio is calculated by dividing the manager's returns by the returns of the index during the up market, and multiplying that factor by 100. A manager with an up-capture of greater than 100 means the manager outperforms in rising markets. A down-capture of less than 100 means the manager has loss less than the market when it falls.

Correlation. Correlation measures the relationship, and movement, of two or more securities, which ranges between -1 and +1. Perfect positive correlation (a correlation of +1) implies that as one security moves, either up or down, the other security will move in lockstep, in the same direction. Alternatively, perfect negative correlation means that if one security moves in either direction, the security that is perfectly negatively correlated will move in the opposite direction. If the correlation is zero, the movements of the securities are said to have no correlation; they are completely random.

Fundamental indexing. A type of equity index in which components are chosen based on fundamental criteria as opposed to market capitalization. Fundamentally weighted indexes may be based on fundamental metrics such as revenue, sales, dividends, earnings, or book value. Proponents of these indexes claim that they are a more accurate aggregate measure of the market because market-capitalization figures tend to overweight companies that are richly valued while underweighting companies with low valuations. Fundamental indexes are sometimes referred to as *alternative beta* or *smart beta*.

Information ratio. A ratio of portfolio returns above the returns of a benchmark (usually an index) to the volatility of those returns. The information ratio (IR) measures a portfolio manager's ability to generate excess returns relative to a benchmark, but also attempts to identify the consistency of the investor. This ratio will identify whether a manager has beaten the benchmark by a lot in a few months or a little every month. The higher the IR, the more consistent a manager is, and consistency is an ideal trait.

Market-cap weighting. Most of the broadly used market indexes today are "cap-weighted" indexes, such as the S&P 500, the MSCI indexes, and many of the Russell indexes. In a cap-weighted index, large price moves in the largest components can have a dramatic effect on the value of the index. Some investors feel that this overweighting toward the larger companies gives a distorted view of the market. Many index providers also offer non-cap-weighted versions of their indexes.

Modern portfolio theory. According to the theory, it's possible to construct an "efficient frontier" of optimal portfolios offering the maximum possible expected return for a given level of risk. This theory was pioneered by Harry Markowitz in his paper "Portfolio Selection," published in 1952 by the *Journal of Finance*.

Post-modern portfolio theory. A portfolio optimization methodology that uses the downside risk of returns instead of the mean variance of investment returns used by modern portfolio theory. The difference lies in each theory's definition of risk, and how that risk influences expected returns. Post-modern portfolio theory (PMPT) uses the standard deviation of negative returns as the measure of risk, while modern portfolio theory uses the standard deviation of all returns as a measure of risk.

Prospect theory. A theory that people value gains and losses differently and, as such, will base decisions on perceived losses. Thus, if a person were given two equal choices, one expressed in terms of possible losses and the other in possible gains, the person would choose the former. Also known as "loss-aversion theory."

Sharpe ratio. The Sharpe ratio tells us whether a portfolio's returns are due to smart investment decisions or a result of excess risk. This measurement is very useful because although one portfolio or fund can reap higher returns than its peers, it is only a good investment if those higher returns do not come with too much additional risk. The greater a portfolio's Sharpe ratio, the better its risk-adjusted performance has been. A negative Sharpe ratio indicates that a riskless asset would perform better than the security being analyzed.

Sortino ratio. A ratio developed by Frank A. Sortino to differentiate between good and bad volatility in the Sharpe ratio. This differentiation of upward and downward volatility allows the calculation to provide a risk-adjusted measure of a security or fund's performance without penalizing it for upward price changes.

Standard deviation. Standard deviation is a statistical measurement that sheds light on historical volatility. For example, a volatile portfolio will have a higher standard deviation than a less volatile portfolio. A large dispersion tells us how much the return on the fund is deviating from the expected normal returns.

Tail risk. When a portfolio of investments is put together, it is assumed that the distribution of returns will follow a normal pattern. Under this assumption, the probability that returns will move between the mean and three standard deviations, either positive or negative, is 99.97%. This means that the probability of returns moving more than three standard deviations beyond the mean is 0.03%, or virtually nil. However, the concept of tail risk suggests that the distribution is not normal, but skewed, and has fatter tails. The fatter tails increase the probability that an investment will move beyond three standard deviations.

Tracking error. Tracking errors are reported as a "standard deviation percentage" difference. This measure reports the difference between the return an investor receives and that of the benchmark he or she was attempting to imitate.

For more information

Contact Schwab Investment Solutions at (877) 824-5615 or InvestmentSolutions@schwab.com to learn more.

Anthony B. Davidow, CIMA®
Vice President, Alternative Beta and Asset Allocation Strategist
Schwab Center for Financial Research

Anthony Davidow is responsible for providing Schwab's point of view on asset allocation and portfolio construction. He is also responsible for providing research and analysis on alternative beta strategies and how investors should incorporate them in their portfolios.

Before joining Schwab, Davidow was a managing director, portfolio strategist, and head of the ETF Knowledge Center for Guggenheim Investments. Before joining Guggenheim, Davidow was executive vice president and head of distribution for IndexIQ. Previously, he spent 15 years at Morgan Stanley, where he served as managing director and head of sales and training for the Consulting Services Group. While at Morgan Stanley, he worked with many of the firm's largest clients in developing and implementing asset allocation strategies, incorporating active and passive strategies, and using alternative investments as risk management tools.

Davidow has authored several white papers and strategy pieces and spoken at industry conferences on a range of topics, including "The Merits of Core-Satellite Investing," "Asset Allocation and Manager Selection: Adaptive Allocation," "Alpha-Beta Separation," "Alternative Weighting Strategies," "The Role and Use of Alternative Investments," and "Currency as an Asset Class."

Davidow holds a B.B.A. degree in finance and investments from Bernard M. Baruch College and has earned the Certified Investment Management Analyst (CIMA®) designation from the Investment Management Consultant's Association (IMCA) and the Wharton School of the University of Pennsylvania. He sits on the board of directors for IMCA. He holds Series 7, 24, and 63 registrations.

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