THE ACADEMIC ADVANTAGE

The Evidence and Research Behind IFA’s Advice
We take an academic approach to investing at Index Fund Advisors, Inc. We utilize an evidence-based strategy that relies on objective, peer-reviewed research that has been published in academic financial and economic journals. Using this research, we have created portfolios designed to maximize expected return for risk taken.

The peer-review process ensures that academic articles are only published after a high level of scrutiny by qualified members of the profession within the relevant field. After publication, such articles are subject to further scrutiny by the journal's professional readership. Further research in subsequent years may confirm, modify, or refute prior research. However, it is all subject to the peer-review process and publication in academic journals. This assures that any such research represents the state of the art at any given time.

Given the increased fiduciary liability for institutional investors tasked with investing assets in the best interest of others, it is our opinion that such a strategy is, for many reasons, both prudent and proper for public funds.

In contrast, any Wall Street firm can publish “research reports” making unsubstantiated claims (e.g., “Apple's share price will hit $1,000 by the end of the year”). Such forecasting “research” can be authored and published in a matter of days, compared to academic research which often takes years to complete, be reviewed, and published. Such industry-related, proprietary “research” is not subject to the peer-review process or published in reputable, academic journals. It is considered invariably biased, and is not even considered at all when guidelines are published by academic professional organizations.

Here we briefly review but a few of the many seminal research papers from which IFA has developed its investment philosophy. While the research presented in these papers spans 60+ years, and may have been subsequently refined, for the most part, the findings put forth in these papers have stood the test of time. Several have resulted in Nobel prizes for their authors.

After this review, we will explain how IFA has used such research to formulate its investment policy, and used it to create low-cost portfolios that deliver the highest expected return for the risk taken; then why it is our advice that those responsible for investing public funds should make it a cornerstone of the investment plans.
PORTFOLIO SELECTION

By Harry Markowitz; Journal of Finance (1952)

This Nobel Prize-winning paper introduced the now widely accepted notion that when putting together a portfolio, it is not sufficient to focus on returns alone. Risk must be considered as well. Specifically, once we have available historical data, we can make assumptions about expected returns, variances, and correlations of different securities (or asset classes). We can then construct a portfolio that maximizes expected return for a given level of risk, or minimizes risk for a given level of required return. The set of portfolios that meets these criteria is known as “the efficient frontier.”

As an aside, Markowitz was a former academic consultant to IFA. Markowitz is noted to highlight the importance of investors following the advice of academics rather than Wall Street professionals.

CAPITAL ASSET PRICES - A THEORY OF MARKET EQUILIBRIUM UNDER CONDITIONS OF RISK

By William Sharpe; Journal of Finance (1964)

This is another Nobel Prize-winning paper. It took Harry Markowitz’s “Portfolio Selection” one step further. Rather than trying to select an optimal portfolio of individual equities from the thousands of securities in the market, Sharpe showed that investors should simply hold the full market (that is, all equities offered) as the risky part of their allocation. If markets are efficient and investors can act in a completely unconstrained manner, then the market portfolio, which weighs each security according to its market capitalization, is inherently the most efficient possible portfolio. Hence, the model is known as the Capital Asset Pricing Model.


THE BEHAVIOR OF STOCK MARKET PRICES

By Eugene Fama; Journal of Business (1965)

This seminal paper presented the Efficient Market Hypothesis (EMH), which later earned Fama a Nobel Prize. The EMH asserts that security prices reflect all readily available information. Thus, investors cannot consistently achieve returns in excess of market average returns on a risk-adjusted basis.

While EMH is something that technically cannot be proven, there is no evidence that successfully refutes it.

This paper created the field of behavioral economics and finance. This later earned a Nobel Prize for Kahneman (Tversky was deceased by that time). It proposed the notion that human beings are not the “super-rational utility maximizers” that they might be assumed to be under the EMH and CAPM. When faced with probabilities of different outcomes, people do not necessarily make the choices that we would expect from a purely mathematical analysis. Rather, they take extraordinary measures to avoid or limit losses, which curtails their chances of achieving gains. This tendency is known as loss aversion or regret avoidance.

Some practitioners may claim that behavioral finance disproves the EMH, and that all the sub-optimal behavior creates exploitable opportunities for gain. However, the EMH does not presuppose that the information investors act on is reliable and/or accurate. Nor does it state that investors are rational in all their actions. It elegantly and simply states that investors as a group act on all the information that is available; and that individual investors (rational or not), cannot do better than the market itself.

Andrew Lo (of Massachusetts Institute of Technology) has synthesized the two fields in his adaptive market hypothesis.

We should note that the founding fathers of behavioral finance—Kahneman in particular—strongly advocate index funds for most institutions and investors at large.

LINK: http://bit.ly/1JKHH76
These authors asked a simple question: What are the factors that explain the returns of managed portfolios such as pensions and endowments? The possibilities are security selection (stock-picking and bond-picking), market-timing, and asset allocation. In reviewing the returns data for 91 large pension plans over a ten-year period. They found that asset allocation alone was found to explain about 94% of the variation of returns (not the same as the absolute value or total return) of any particular fund.

Roger Ibbotson later expanded on this work, noting that asset allocation explained about 40% of the difference in returns among funds, but 100% of the level of returns gross of fees, on average, across funds.

LINK: http://cfa.is/2kOZFTb
THE CROSS-SECTION OF EXPECTED STOCK RETURNS


COMMON RISK FACTORS IN THE RETURNS ON STOCKS AND BONDS


(See summary on paper #8.)

Dimensions of Expected Returns
Up to 91 Years* (1/1/1928 - 12/31/2018)

Information provided by Dimensional Fund Advisors LP.
All returns are in USD. Premiums are calculated as the difference in annualized returns between the two indices described over the period shown. MSCI indices are gross div. For US stocks, indices are used as follows. Small Cap minus Large Cap: Dimensional US Small Cap Index minus the S&P 500 Index. Value minus Growth: Fama/French US Value Research Index minus the Fama/French US Growth Research Index. High Prof minus Low Prof: Dimensional US High Profitability Index minus the Dimensional US Low Profitability Index. For developed ex US stocks, indices are used as follows. Small Cap minus Large Cap: Dimensional International Small Cap Index minus the MSCI World ex USA Index (gross div.). Value minus Growth: Fama/French International Value Index minus the Fama/French International Growth Index. High Prof minus Low Prof: Dimensional International High Profitability Index minus the Dimensional International Low Profitability Index. For Emerging Markets stocks, indices are used as follows. Small Cap minus Large Cap: Dimensional Emerging Markets Small Cap Index minus MSCI Emerging Markets Index (gross div.). Value minus Growth: Fama/French Emerging Markets Value Index minus Fama/French Emerging Markets Growth Index. High Prof minus Low Prof: Dimensional Emerging Markets High Profitability Index minus the Dimensional Emerging Markets Low Profitability Index. Profitability is measured as operating income before depreciation and amortization minus interest expense, scaled by book. Indices are not available for direct investment. Index returns are not representative of actual portfolios and do not reflect costs and fees associated with an actual investment. Past performance is no guarantee of future results. Actual returns may be lower. See www.ifaindexes.com for descriptions of Dimensional and Fama/French index data. S&P data © 2019 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved. MSCI data © MSCI 2019, all rights reserved.
SIZE AND BOOK-TO-MARKET FACTORS IN EARNINGS AND RETURNS

By Eugene Fama and Kenneth French; Journal of Finance (1994)

This series of papers from Fama (University of Chicago) and French (Dartmouth University) established the 3-Factor Model for equity portfolios, and the 5-Factor Model for balanced portfolios of equities and bonds.

The Fama/French Three-Factor Model says the expected return of a broadly diversified stock portfolio in excess of a risk-free rate is a function of that portfolio's sensitivity or exposure to three common risk factors. They are: (1) a market factor, as measured by the excess return of a broad equity market portfolio relative to a risk-free rate; (2) a size factor, as measured by the difference between the returns of a portfolio of small stocks and the returns of a portfolio of large stocks; and (3) a value factor, as measured by the difference between the returns of a portfolio of high book-to-market (or value) stocks and the returns of a portfolio of low book-to-market (or growth) stocks.

MARKET TIMING ABILITY AND VOLATILITY IMPLIED IN INVESTMENT NEWSLETTER ASSET ALLOCATION RECOMMENDATIONS


The authors analyzed over 15,000 asset allocation recommendations from 237 investment newsletters from 1980 to 1992. Once adjusted for risk, they found that over 75% of the newsletters produced negative abnormal returns. To quote them, “Some recommendations are remarkably poor. For example, the (once) high profile Granville Market Letter-Traders produced an average annual loss of 5.4% over the past 13 years. This compares to 15.9% average annual gain on the S&P 500 index.”

LINK: http://bit.ly/2kmQztG
VALUE VERSUS GROWTH: THE INTERNATIONAL EVIDENCE

This paper tested the applicability of the Fama-French Three-Factor Model to international equity returns. The model was found to be valid here also. In addition, besides having a higher expected return over time, there is an additional benefit of a lower correlation with the U.S. market, which provides a diversification benefit.

LINK: http://bit.ly/1rL6hfJ

<table>
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<th>Large, Small, Value and Growth Indexes Around the World</th>
<th>Annualized Returns and Standard Deviations Over Various Periods</th>
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<td>10.04%</td>
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<td>Emerg. Market Blend</td>
<td>10.16%</td>
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<tr>
<td>Emerg. Market Growth</td>
<td>9.11%</td>
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</table>

Past performance does not guarantee future results. Performance may contain both live and back-tested data. Data is provided for illustrative purposes only, it does not represent actual performance of any client portfolio or account and it should not be interpreted as an indication of such performance.
FALSE DISCOVERIES IN MUTUAL FUND PERFORMANCE: MEASURING LUCK IN ESTIMATING ALPHAS

By Laurnet Barras, Olivier Scaillet and Russ Wermers; Journal of Finance (2010)

When a mutual fund manager has a statistically significant different performance than the fund's benchmark (i.e., a statistically significant positive or negative alpha), there are two possible explanations: skill or luck. The authors define a “false discovery” as a mutual fund that exhibits significant alpha by luck alone. Using a sample of 2,076 actively managed US equity funds between 1975 and 2006, the authors found that total observed alpha is consistent with the following breakdown: 75.4% of the funds had a true alpha of zero after costs. Also, 24.0% had a true alpha that was negative. That left only 0.6% with a true positive alpha, a number that the authors considered to be “statistically indistinguishable from zero”.

LINK: http://bit.ly/2rCHkLH
The authors examined the performance of investment managers before and after they were either hired or fired by institutional plan sponsors. This study was based on an analysis of almost 8,800 hiring decisions by more than 3,400 plan sponsors from 1994 to 2003. The sample also included 869 firing decisions made by 482 institutions. Newly hired managers tended to have excess returns that were statistically significant before hiring and then became statistically indistinguishable from zero after hiring. In an ironic twist, fired managers tended to have higher returns than the managers hired to replaced them.

This study is similar to the Goyal and Wahal study described above. However, rather than looking at hiring and firing decisions, the authors examined changes in asset allocations made by plan sponsors. Such changes automatically necessitate hiring and firing decisions. The authors found that only in two out of the eighteen years from 1985 to 2002 did plan sponsor decisions add value over the next five years.

Performance-chasing was felt to be the primary underlying cause of this underperformance. The authors noted that plan sponsors are more likely to throw money at the asset class that has recently had high returns, only to be disappointed. The authors estimated the economic impact of these ill-fated decisions to be $170.2 billion for the full sample period.

LINK: http://cfa.is/2kTtQs2
LUCK VERSUS SKILL IN THE CROSS SECTION OF MUTUAL FUND RETURNS


This study was influential in how we could decipher luck from skill in the context of the entire universe of actively managed mutual funds. Given the thousands of actively managed mutual funds that exist, there is the potential for extreme returns based on random chance alone. The authors examined the 3-Factor (Fama/French 3 Factor Model) adjusted excess returns (alpha) of 3,156 actively managed mutual funds between 1984 to 2006. They then compared these aggregate results to a distribution of potential 3-factor (Fama/French Three Factor Model) adjusted excess returns (alpha) based on random outcomes. They concluded that the net excess returns (after fees) of the active fund management community were no better than what would be expected by random chance. If there are some skilled managers who can produce enough risk-adjusted outperformance to cover their costs, they are hidden by the mass of managers with insufficient skill.


WE HAVE MET THE ENEMY...AND HE IS US: LESSONS FROM TWENTY YEARS OF THE KAUFFMAN FOUNDATION’S INVESTMENTS IN VENTURE CAPITAL FUNDS AND THE TRIUMPH OF HOPE OVER EXPERIENCE

By Diane Mulcahy, Bills Weeks, and Harold S. Bardley; Ewing Marion Kauffman Foundation (2012)

The authors examined the performance of nearly 100 venture capital funds their own $1.83 billion endowment invested in from 1992-2011. They found that the majority of funds—62 out of 100--failed to exceed returns available in public markets, after fees and carry were paid. Only 4 of the 30 venture capital funds with committed capital of more than $400 million delivered returns better than those available from a publicly traded small cap common stock index. The cumulative effect of fees, carry, and the uneven nature of venture investing ultimately left them with 78% of their funds that did not achieve returns sufficient to reward them for their patient, expensive, and long-term approach to investing in their endowment.

THE OTHER SIDE OF VALUE: THE GROSS PROFITABILITY PREMIUM

By Robert Novy-Marx (2012)

This groundbreaking article found an additional dimension of expected return using a proxy labeled “gross profitability.” The author found that gross profitability, defined as gross profits-to-assets, had approximately the same power as book-to-market, a common proxy for “value,” in predicting the cross-section of average returns. From a portfolio perspective, controlling for profitability was shown to dramatically increase the performance of value strategies, especially among the largest, most liquid stocks in the market. Because strategies based on profitability are typically growth strategies, they provide an excellent complement to value strategies, thus improving an investor’s overall opportunity set.


THE PROFITABILITY AND INVESTMENT PREMIUM

By Sunil Wahal (2016)

The author builds on the profitability and investment premium research done by Robert Novy-Marx, Eugene Fama, and Kenneth French by extending the sample time period back to 1940. Mr. Wahal concludes that the profitability premium is similar in magnitude to the post 1963 period, which further strengthens the argument for the existence of the profitability premium by demonstrating that the research is not subject to sampling bias. The author also concluded that the five-factor model from Fama and French is still useful for measuring the style tilts of managed portfolios.

PRIVATE EQUITY PERFORMANCE: RETURNS, PERSISTENCE AND CAPITAL FLOWS

By Steve Kaplan and Antoinette Schoar (2003)

Authors investigated the performance and capital flows of 746 private equity partnerships and concluded that the average fund returns (net of fees) approximately equal the S&P 500 over the time period over the 18 year period from 1980 to 1997. Weighted by committed capital, venture funds outperform the S&P 500 before fees while buyout funds do not. The authors also acknowledge the limitations of their conclusions given problems arising from differences in market risk and the possibility of selection bias, a common problem also found when examining the performance of hedge funds.


*Comment on downside risk/returns: active vs passive

Before proceeding to how we implement the above, we would like to note one further research finding. Or, rather, its lack thereof. Proponents of active management claim to be able to minimize downside risk during falling markets compared to similarly allocated but passively managed portfolios. However, we can find no academic research to support the claim that actively managed portfolios minimize losses compared to passively managed portfolios. Such a claim appears to be a myth perpetuated by active managers to assure a stream of income—for themselves.

We challenge any active fund manager to present peer-reviewed, academic articles refuting any of the above research.
IFA relies on Modern Portfolio Theory (MPT) in the construction of its portfolios. We start with a default market portfolio (in other words, owning the entire market) then successively add asset classes that historically either increase expected returns or reduce risk. IFA does not utilize a technological “optimizer” or automatic algorithm in the construction of its portfolios. Any such resulting asset allocations would be extremely sensitive to the assumptions, which, if even slightly off, could lead to significantly different outcomes. IFA does not consider it prudent to attempt to forecast future returns, risks, and correlations for different asset classes for public fund managers. While the efficient frontier is easily found in hindsight, it is unknowable in advance.

The CAPM robustly reinforces the idea that risk and return are inseparable. However, it does not do a very good job of explaining the returns of diversified portfolios. Fama and French solved this by noting the increased returns from small cap and value stocks. IFA deviates from the market portfolio by, among other means, tilting towards small cap and value stocks in the equity portion of its portfolios, resulting in higher expected returns than the market as a whole, as seen in the following scatter-plot chart.
Indexes in square buttons are excluded from IFA Index Portfolios. For detailed information on the hypothetical backtested performance data in this chart, including sources, updates and important disclosures, see www.ifabt.com. IFA Index Portfolios are labeled with numbers that refer to the percentage of stock indexes in the asset allocation, as opposed to the allocation of bond indexes. IFA Indexes are labeled with letters to designate the index name and are defined at ifaindexes.com. Hypothetical backtested performance of IFA Index Portfolios assumes annual rebalancing of the asset allocation of the component ifaindexes.com. The hypothetical backtested performance of the IFA Indexes and IFA Index Portfolios was achieved with the benefit of hindsight; it does not represent actual investment strategies for the entire period; and it does not reflect the impact that economic and market factors may have had on the advisor’s decision making if the advisor were actually managing client money. The performance of index portfolios does reflect the deduction of 0.9% annual investment advisory fee, which is the maximum advisory fee charged by IFA, and mutual fund fees associated with the management of an actual portfolio over the entire period. Unless indicated otherwise, the performance of the IFA Indexes when shown individually, do reflect mutual fund fees, but not IFA advisory fees and include dividends. IFA Indexes and IFA Index Portfolios were created by IFA in 2000. The S&P 500 Index is an unmanaged market capitalization-weighted index composed of the 500 most widely held, publicly traded companies, whose assets and/or revenues are based in the US. The inclusion of information within charts and graphs relating to the S&P 500 Index is for informational purposes and shown as a comparison to other indexes, index portfolios or funds and as a general performance of large companies in the U.S. Past performance does not guarantee future results. Performance may contain both live and back-tested data. Data is provided for illustrative purposes only, it does not represent actual performance of any client portfolio or account and it should not be interpreted as an indication of such performance. IFA utilizes standard deviation a quantification of risk, see an explanation in the www.ifa.com/glossary/#standard-deviation

IFA adheres to the philosophy that once investors have found and implemented a risk-appropriate portfolio, their best course of action is to avoid becoming emotionally involved. For instance, if investors scrutinize the market over any short-term period (daily, weekly, monthly, or quarterly), and the market makes a large move, they are more likely to overreact inappropriately and do more harm than good.
That said, IFA reminds investment committee members that appropriate risks are a reliable source of long-term returns. Indeed, there is no such thing as excess return without risk. Of course, investors need to understand that only some risks are compensated. IFA warns investors to avoid all types of active investing, be it stock-picking, time-picking, manager-picking, economic or political forecasting, etc.

To quote Benjamin Graham, “The investor’s chief problem—and even his worst enemy—is likely to be himself.”

IFA takes the position that the single most important decision investment committee members can make is the asset allocation of their portfolios dictated by a prudent Investment Policy Statement (for an excellent resource please read the 1985 classic book “Investment Policy,” by Charles D. Ellis). Security selection and market timing are unlikely to add any value and usually incur unnecessary costs. Instead, IFA captures the risk premiums of market, size, value, term, and default as modelled by academics Fama and French.

IFA has studied in detail the practical applications of these multi-factor models to its portfolios. Thus, IFA constructs its portfolios based on the Three and Five Factor Models.

IFA encourages public fund investment committee members to avoid investment strategies involving stock picking, marketing timing, active manager picking, or style drifting. These strategies have been shown through academic evidence to not provide the consistent excess market returns that they are seeking to capture. A much more prudent strategy would be to buy, hold, and rebalance a globally diversified portfolio of index funds that properly matches the public fund’s capacity for risk.

“The deeper one delves, the worse things look for actively managed funds,” wrote Dr. William Bernstein wrote more than 15 years ago. IFA agrees, and will continue relying on long-term historical data and research such as those cited above to inform our evidence-based approach that has stood the test of time.
Index Fund Advisors, Inc. (IFA) does not guarantee any minimum level of investment performance or the success of any index portfolio, index, mutual fund or investment strategy. Past performance does not guarantee future results. There is a potential for loss in any investment, including loss of principal invested. All investments involve risk and investment recommendations will not always be profitable. No representation is being made that any IFA client account will or is likely to achieve profit or losses similar to those shown in hypothetical backtested performance. Impacts of federal and state taxes and trading costs are not included in the results of index portfolio or index returns. Hypothetical backtested performance information shown in text, charts, tables and graphs are provided for informational purposes only and should not be considered investment advice or recommendations to buy or sell any types of securities.

**Hypothetical Backtested Performance**

1. The IFA Indexes include several stock and bond indexes that represent a monthly data series that begins with index data from various sources on January 1, 1928. The construction of IFA Indexes data introduces live mutual fund data of funds that are similar to the preceding index upon the inception date of the funds and uses that monthly mutual fund data up to the current month. IFA Index Portfolios are allocations of a globally diversified selection of between 11 and 15 IFA Indexes, where the Index Portfolio designation number represents the allocation to stock indexes versus bond indexes. For example an IFA Index Portfolio 90 is 90% IFA stock indexes and 10% IFA bond indexes. The data for both the IFA Indexes and the model data for IFA Index Portfolios is hypothetical backtested performance data that represents a combination of index data and mutual fund data. Please refer to the IFA Indexes Data Sources page at www.ifaindexes.com for a description and the time series construction of the underlying index and mutual funds for each IFA Index. A review of the IFA Index Data Sources, IFA Indexes Time Series Construction (http://www.ifa.com/disclosures/charts/#timeseries) and several of the Dimensional Indexes (http://www.ifa.com/disclosures/charts/#dfafunds) is an integral part of this disclosure and should be read in conjunction with this explanation of the hypothetical backtested performance of the indexes and the model IFA index portfolios, which are allocations of the IFA Indexes. An extensive glossary of terms used throughout IFA’s content can be found at https://www.ifa.com/glossary/.

2. The investment strategy of the IFA index portfolios is a buy and hold strategy with annual rebalancing of the index allocation on the first of each year. The data is provided to show historical risk and return performance had the indexes and index portfolios been available over the relevant time period. IFA did not offer the index portfolios until November 1999. Prior to 1999, IFA did not manage client accounts. There are certain limitations inherent in model results, particularly that model returns do not reflect trading in actual client accounts and do not reflect the impact that material economic and market factors may have had on the adviser’s decision-making had the adviser actually managed client funds.

3. Hypothetical backtested performance also differs from actual performance because it is achieved through the retroactive application of model index portfolios designed with the benefit of hindsight. As a result, the models theoretically may be changed from time to time and the effect on performance results could be either favorable or unfavorable. Hypothetical backtested performance is calculated by using a software program that starts with the first day of a selected month and ends with the last day of a selected month. Whenever the term IFA Index Portfolio Value data is used, it is based on a starting value of one at the beginning of stated time period.

4. Hypothetical backtested performance results for IFA index portfolios are based on a buy and hold strategy, with annual rebalancing on the first of each year. It is important to understand that the assumption of first of the year annual rebalancing has an impact on the monthly returns reported for IFA Index Portfolios throughout the year. If there were monthly rebalancing instead, the monthly return would be calculated with the assumption that the portfolio is perfectly in balance at the beginning of each month. For annual rebalancing, the year-to-date and monthly return is calculated with the assumption that the portfolio is perfectly in balance only at the beginning of each year. In actual client portfolios, however, rebalancing occurs as needed, and such actions are dependent on both market conditions and individual client cash inflows and outflows, along with the cost impact of such transactions on the overall portfolio.

5. Hypothetical backtested performance results for index portfolios does include the reinvestment of dividends and capital gains and is shown net of IFA’s highest advisory fee of 0.9%. The fee of 0.075% is deducted from month end returns, unless stated otherwise. However, actual client advisory fees are deducted quarterly, in advance. Depending on the amount of assets under management and other factors, investment management fees may be less. IFA accepts no fees from investment product firms.

**Performance Results and Composition of IFA Indexes and IFA Index Portfolios**

6. Performance results for actual clients that invested in accordance with the IFA Index Portfolio Models will vary from the backtested performance due to the use of funds for implementation that differ from those in the index data, market conditions, investments cash flows, mutual fund allocations, changing index allocations over time, frequency and precision of rebalancing, not following IFA’s advice, retention of previously held securities, tax loss harvesting and glide path strategies, cash balances, lower advisory fees, varying custodian fees, and/or the timing of fee deductions. Tax liabilities will vary per investor and can result from various activities in taxable and tax-deferred accounts. These activities include, but are not limited to rebalancing of portfolios, any sale of securities, tax loss harvesting, interest, dividends and capital gains distributions from equity funds and individual securities in taxable accounts. There are also tax liabilities associated with distributions from tax-deferred accounts. Not all IFA clients follow IFA’s recommendations and depending on unique and changing client and market situations, IFA may customize the construction and implementation of the index portfolios for particular clients. IFA provides various index portfolio implementation strategies, such as the use of tax-managed mutual funds, global extended maturity bond funds, municipal bond funds, social or sustainable screens added to funds, diversified portfolios of various index fund providers, use of core funds or global asset allocation funds. These various implementations of IFA Index Portfolios will likely have risks and returns that vary from the IFA Index Portfolio Models. As the result of these and other variances, actual performance for client accounts have been and are likely to be materially different and may be less than from the results shown in the IFA Index Portfolio Models. Clients should consult their account statements for information about how their actual performance compares to that of the index portfolios and ask your IFA Wealth Advisor to explain any differences.

7. The indexes and mutual funds used in the IFA Indexes are IFA’s best estimate of an index or mutual fund that comes closest to the corresponding IFA Index objectives. Simulated index data is used for...
the period prior to the inception of the relevant live mutual fund data and a mutual fund expense ratio is deducted from the simulated index data. Live (or actual) mutual fund performance data is used after the date each mutual fund was added to the IFA Indexes. The IFA Indexes Times Series Construction goes back to January 1928, with an increasing diversification to international markets, emerging markets and real estate investment trusts as data became available. As of January 1928, there are four equity indexes and two bond indexes; in January 1970 there are a total of 8 indexes, and there are 15 indexes in March 1998 to present. See (https://www.ifa.com/disclosures/charts/#IFA_evolution) to see the analysis of the evolution of these index portfolios.

8. This is the history of changes made to the IFA Indexes and IFA Index Portfolios: 1992-2000: IFA's Original Index Portfolios 10, 30, 50, 70 and 90 (the number refers to the percentage of stock indexes versus bond indexes in the allocation) were suggested by Dimensional Fund Advisors (DFA) in 1992 (ifa.com/pdfs/1992.pdf), as an example of globally diversified asset classes, with moderate modifications in 1995 (ifa.com/pdfs/1995.pdf). Index Portfolios between each of the above listed portfolios were created by IFA in 2000 by interpolating between the above portfolios. Portfolios 5, 95 and 100 were created by IFA in 2000, as a lower and higher extension of the DFA 1992 risk and return options. There are numerous other changes that occurred from 2002 to present and they are all described on www.ifa.com and the IFA app is your acknowledgement that you have read and understood the full disclaimer as stated above. Updated 6-12-2019. For additional updates please refer to www.ifabt.com.

9. The S&P 500 Index is an unmanaged float-adjusted market capitalization-weighted index composed of the 500 most widely held, publicly traded companies, whose assets and/or revenues are based in the US. The inclusion of information within charts and graphs relating to the S&P 500 Index is for informational purposes and shown as a comparison to other indexes, index portfolios or funds and as a general performance of large companies in the U.S.

Information About Index Fund Advisors
10. Index Fund Advisors, Inc. is an SEC registered Investment Adviser. Information pertaining to IFA’s advisory operations, services, and fees is set forth in IFA’s current Form ADV Part 2 (Brochure) which is available upon request and at www.adviserinfo.sec.gov. The IFA investment strategy is based on principles generally known as Modern Portfolio Theory and the Fama and French Four Factor Model for Equities and Two Factor Model for Fixed Income. IFA Index portfolios are designed to provide substantial global diversification in order to reduce investment concentration and the resulting potential increased risk caused by the volatility of individual companies, indexes, or asset classes. IFA defines index funds as funds that follow a set of rules of ownership that are held constant regardless of market conditions. An important characteristic of an index fund is that its rules of ownership are not based on a forecast of short-term events or the mispricing of securities. Therefore, an investment strategy that is limited to the buying and rebalancing of a portfolio of index funds is often referred to as passive investing, as opposed to active investing. IFA is not paid any brokerage commissions, sales loads, 12b-1 fees, or any form of compensation from any mutual fund company or broker dealer. The only source of compensation from client investments is obtained from asset-based advisory fees paid by clients or tax or accounting related services. More information about advisory fees, expenses, mutual fund fees, and prospectuses for mutual funds can be found at https://www.ifa.com/fees/.

Associated Risks
11. IFA Index Portfolios will be implemented for clients by investing in an allocation of mutual funds that match the asset classes, mainly mutual funds from Dimensional Fund Advisors. All mutual funds carry risk and those risks can vary depending on the underlying investments and the fund’s investment strategy. IFA Index Portfolios are numbered from 1 to 100 based on the percentage allocation to equity indexes. Index portfolios with lower equity allocations will have less risk, as measured by standard deviation, than those with a higher equity allocations. There is risk of loss in any securities investment, including the risk of loss of principal that the investor should be prepared to bear. Clients are provided with a copy of each mutual fund prospectus, which outlines the risks associated with the fund and should be read carefully. There is no guarantee that any IFA Index Portfolio will meet its investment objectives.

Standard Deviation Information
12. IFA utilizes standard deviation a quantification of risk. Standard deviation is a common measure of risk used by academics, analysts, portfolio managers and advisors. The higher the standard deviation the higher the risk. Standard deviation is calculated as the square root of the variance of the data from the average, which is a measure of the dispersion of a set of data from its average. If data points are far from the average, there is a higher deviation within the data set; thus, the more spread out the data, the higher the standard deviation. In finance, standard deviation is applied to the rate of return of an investment to measure the investment’s volatility. Standard deviation is also known as historical volatility and is used by investors as a gauge for the amount of expected volatility or the uncertainty of expected returns. Among indexes of stocks, those with smaller companies, international companies and emerging market companies have had higher standard deviations than large companies in the U.S. in long time periods. Among bond indexes, those with longer durations and greater probabilities of default have had higher standard deviations in long time periods. However, it is not true that all indexes with higher standard deviations, such as small growth companies have had higher returns in long time periods. Annualized standard deviation is an approximation obtained by multiplying the monthly standard deviation by the square root of 12, which is 3.46. Please note that the number computed from annual data may differ materially from the estimate obtained from monthly data. IFA has chosen this methodology because Morningstar uses the same method. In those charts and tables where the standard deviation of daily returns is shown, it is estimated as the standard deviation of monthly returns divided by the square root of 22, which is 4.69.

Data Source Information
13. IFA licenses the use of data, in part, from Morningstar Direct, a third-party provider of stock market data. Where data is cited from Morningstar Direct, the following disclosures apply: ©2019 Morningstar, Inc. All rights reserved. The information provided by Morningstar Direct and contained herein: (1) is proprietary to Morningstar and/or its content providers; (2) may not be copied or distributed; and (3) is not warranted to be accurate, complete or timely. Neither Morningstar nor its content providers are responsible for any damages or losses arising from any use of this information. IFA Index Portfolios, times series, standard deviations, and returns calculations are derived using IFA software. IFA software applies rebalancing rules, monthly fee adjustments and creates time series construction of data. Our source data comes from many places including Dimensional Fund Advisors and Morningstar Direct software.

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The following descriptions, definitions and important information explain how IFA Indexes are constructed to simulate similar risk and return characteristics back to 1928. The data for both the IFA Indexes and the model data for IFA Index portfolios is hypothetical backtested performance data that represents a combination of index data and live mutual fund data. This long-term data reduces the possible errors of interpreting past short-term returns as being representative of future short-term returns. Such errors are especially high for periods of 20 years or less. When IFA Indexes are shown in Index Portfolios, all return data reflects a deduction of all mutual fund fees and a 0.90% annual investment advisory fee, which is the maximum advisory fee charged by IFA. Unless indicated otherwise, data shown for each individual IFA Index is shown without a deduction of the IFA advisory fee. This method is used because the creation, choice, monitoring and rebalancing of diversified index portfolios are the services of the independent investment advisor. Therefore, fees are deducted from the whole portfolio data but not the individual index data. Live Dimensional Fund Advisors’ (DFA) fund data reflects the deduction of mutual fund advisory fees, brokerage fees, other expenses incurred by the mutual funds, incorporates actual trading results, and is sourced from DFA. Hypothetical backtested index data also reflects mutual fund expense ratios for the entire period. Both hypothetical backtested and live data reflect total returns, including dividends and capital gains, except for IFA/NSDQ Index. For updates on sources and descriptions of data see www.ifaintdexes.com.

See a summary of history made to the IFA Indexes and Index Portfolios at www.ifa.com/disclosures/history/.

**IFA U.S. Large Company Index**

**TIME-SERIES CONSTRUCTION**
- Jan 1928 - Dec 1990: Dimensional US Large Cap Index Minus 0.00167%/mo (mutual fund exp ratio)
- Jan 1991 - Apr 2010: DFA U.S. Large Company Fund
- May 2010 - June 2017: DFA U.S. Large Company Fund (DFUSX)
- July 2017 - Present: Schwab S&P 500 Index (SWPPX)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**
- **Dimensional US Large Cap Index**: January 1928 - Dec 1990: Dimensional US Large Cap Index Composition: Market-capitalization-weighted index of securities of the largest US companies whose market capitalization falls in the highest 90% of the total market capitalization of the Eligible Market. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UIUs, and Investment Companies. Source: CRSP and Compustat.

The Dimensional US Large Cap Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to March 1st, 2007. Accordingly, the results shown during the periods prior to March 1st, 2007 do not represent actual returns of the Index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstituted once a year at the end of each month of the year. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results.

- **DFA U.S. Large Company Fund**: Jan 1991 - April 2010: The U.S. Large Company Portfolio generally invests in the stocks that comprise the S&P 500® Index in approximately the proportions they are represented in the S&P 500® Index. The S&P 500® Index comprises a broad and diverse group of stocks. Generally, these are the U.S. stocks with the largest market capitalizations and, as a group, they generally represent approximately 80% of the total market capitalization of all publicly traded U.S. stocks. Actual performance results assume the reinvestment of dividends and capital gains. Fund is closed.

- **DFA U.S. Large Company Fund (DFUSX)**: May 2010 - May 2017: The U.S. Large Company Portfolio generally invests in the stocks that comprise the S&P 500® Index in approximately the proportions they are represented in the S&P 500® Index. The S&P 500® Index comprises a broad and diverse group of stocks. Generally, these are the U.S. stocks with the largest market capitalizations and, as a group, they generally represent approximately 80% of the total market capitalization of all publicly traded U.S. stocks. Actual performance results assume the reinvestment of dividends and capital gains.

- **Schwab S&P 500 Index (SWPPX)**: July 2017 - Present: The investment seeks to track the total return of the S&P 500® Index. The fund generally invests at least 80% of its net assets in stocks that are included in the S&P 500® Index. It generally gives the same weight to a given stock as the index does. The fund may invest in derivatives, principally futures contracts, and lend its securities to minimize the gap in performance that naturally exists between any index fund and its corresponding index. It may concentrate its investments in an industry or group of industries to the extent that its comparative index is also so concentrated. Actual and backtested performance results assume the reinvestment of dividends and capital gains.

**IFA U.S. Large Cap Value Index**

**TIME-SERIES CONSTRUCTION**
- Jan 1928 - Feb 1993: Dimensional Large Value Index minus 0.0225%/mo (mutual fund exp ratio)
- Mar 1993 - Present: DFA U.S. Large Cap Value Fund (DFLVX)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**
- **Dimensional US Large Cap Value Index**: January 1928 - December 1974: Dimensional US Large Cap Value Index Composition: A subset of the US Large Cap Index. The subset is defined as companies whose relative price is in the bottom 25% of the US Large Cap Index after the exclusion of utilities, companies lacking financial data, and companies with negative relative price. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UIUs, and Investment Companies. Source: CRSP and Compustat.

January 1975 - Feb 1993: Dimensional US Large Cap Value Index Composition: Consists of companies with market capitalizations above the 1000th largest company of the Eligible market whose relative price is in the bottom 30% of large companies after the exclusion of utilities, companies lacking financial data, and companies with negative relative price. The Index emphasizes securities with higher profitability, lower relative price, and lower market capitalization. Profitability is defined as operating income before depreciation and amortization minus interest expense divided by book equity. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UIUs, and Investment Companies Source: CRSP and Compustat.

The Dimensional US Large Cap Value Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to March 1st, 2007. Accordingly, the results shown during the periods prior to March 1st, 2007 do not represent actual returns of the Index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstituted once a year at the end of each month of the year. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results.

- **All live mutual fund portfolios tracked in IFA indexes are net of all mutual fund fees.**
- **Indexes and hypothetical backtested data are also net of estimated mutual fund fees.**
- **IFA Advisory fees are deducted when IFA indexes are presented in the IFA Index Portfolios.**
year at the end of each month of the year. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results. The calculation methodology for the Dimensional US Large Cap Value Index was amended on January 1st, 2014 to include profitability as a factor in selecting securities for inclusion in the index.

- **DFA US Large Cap Value Portfolio I (DFLVX):** Mar 1993 - Present: The U.S. Large Cap Value Series, using a market capitalization weighted approach, purchases a broad and diverse group of readily marketable securities of large U.S. companies that the Advisor determines to be value stocks. Actual performance results assume the reinvestment of dividends and capital gains.

### IfA U.S. Small Cap Index

**TIME-SERIES CONSTRUCTION**

- Jan 1928 - Mar 1992: Dimensional Small Cap Index minus 0.0308%/mo (mutual fund exp ratio)
- Apr 1992 - Present: DFA U.S. Small Cap Fund (DFSTX)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**

- **Dimensional Small Cap Index:** January 1928 - December 1974: Dimensional US Small Cap Index Composition: Market-capitalization-weighted index of securities of the smallest US companies whose market capitalization falls in the lowest 8% of the total market capitalization of the Eligible Market. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITs, and Investment Companies Source: CRSP and Compustat.

The Dimensional US Small Cap Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to March 1st, 2007. Accordingly, the results shown during the periods prior to March 1st, 2007 do not represent actual returns of the Index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstructed once a year at the end of each month of the year. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results. The calculation methodology for the Dimensional US Small Cap Index was amended on January 1st, 2014 to include profitability as a factor in selecting securities for inclusion in the index.

- **DFA US Small Cap Portfolio I (DFSTX):** Apr 1992 - Present: The U.S. Small Cap Portfolio, using a market capitalization weighted approach, purchases a broad and diverse group of readily marketable securities of U.S. small cap companies. Actual performance results assume the reinvestment of dividends and capital gains.

### IfA U.S. Small Cap Index

**TIME-SERIES CONSTRUCTION**

- Jan 1928 - Dec 1981: Dimensional US Micro Cap Index minus 0.0433%/mo (mutual fund exp ratio)
- Jan 1982 - Present: DFA US Micro Cap Portfolio (DFSCX)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**

- **Dimensional US Micro Cap Index:** January 1928 - December 1974: Dimensional US Micro Cap Index Composition: Market-capitalization-weighted index of securities of the smallest US companies whose market capitalization falls in the lowest 4% of the total market capitalization of the Eligible Market. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITs, and Investment Companies Source: CRSP and Compustat.

The Dimensional US Micro Cap Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to March 1st, 2007. Accordingly, the results shown during the periods prior to March 1st, 2007 do not represent actual returns of the Index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstructed once a year at the end of each month of the year. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results. The calculation methodology for the Dimensional US Micro Cap Index was amended on January 1st, 2014 to include profitability as a factor in selecting securities for inclusion in the index.

- **DFA US Micro Cap Portfolio I (DFSCX):** Jan 1982 - Present: The U.S. Micro Cap Portfolio, using a market capitalization weighted approach, purchases a broad and diverse group of the securities of U.S. micro cap companies. Actual performance results assume the reinvestment of dividends and capital gains.

### IfA U.S. Small Cap Value Index

**TIME-SERIES CONSTRUCTION**

- Jan 1928 - Feb 2000: Dimensional Targeted Value Index minus 0.0308%/mo (mutual fund exp ratio)
- Mar 2000 - Present: DFA Targeted Value Fund (DFPVX)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**

- **Dimensional Target Value Index:** January 1928 - December 1974: Dimensional US Targeted Value Index Composition: Represents an index of small and mid cap securities with low relative price. Small cap companies with low relative price are generally defined as companies with market capitalizations below the 500th company in the US Market whose relative price is in the bottom 50% of the small and mid cap universe after the exclusion of utilities, companies lacking financial data, and companies with negative relative price. Mid cap companies with low relative price are generally defined as companies whose market capitalization falls below that of the 500th largest company in the Eligible Market, and whose relative price is in the bottom 25% of the small and mid cap universe after the exclusion of utilities, companies lacking financial data, and companies with negative relative price. The Eligible Market is composed of securities of US companies traded on the NYSE, AMEX, and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITs, and Investment Companies Source: CRSP and Compustat.

The Dimensional US Targeted Value Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to March 1st, 2007. Accordingly, the results shown during the periods prior to March 1st, 2007 do not represent actual returns of the Index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstructed once a year at the end of each month of the year. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results. The calculation methodology for the Dimensional US Targeted Value Index was amended on January 1st, 2014 to include profitability as a factor in selecting securities for inclusion in the index.

- **DFA US Small Cap Portfolio I (DFPVX):** Jan 1982 - Present: The U.S. Small Cap Portfolio, using a market capitalization weighted approach, purchases a broad and diverse group of readily marketable securities of U.S. small cap companies. Actual performance results assume the reinvestment of dividends and capital gains.
Profitability is defined as operating income before depreciation and amortization minus interest expense divided by book equity. The Eligible Market is composed of securities of U.S. companies traded on the NYSE, AMEX, and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITs, and Investment Companies Source: CRSP and Compustat.

The Dimensional US Targeted Value Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to March 1st, 2007. Accordingly, the results shown during the periods prior to March 1st, 2007 do not represent actual returns of the index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstituted once a year at the end of each month of the year. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results. The calculation methodology for the Dimensional US Targeted Value Index was amended on January 1st, 2014 to include profitability as a factor in selecting securities for inclusion in the index.

- **DFA Targeted Value Portfolio I (DFVIX):** Jan 1982 - Present: The U.S. Targeted Value Portfolio, using a market capitalization weighted approach, purchases a broad and diverse group of the readily marketable securities of U.S. small and mid cap companies that Dimensional Fund Advisors LP (the “Advisor”) determines to be value stocks. Actual performance results assume the reinvestment of dividends and capital gains.

### IFA Global REIT Index

**TIME-SERIES CONSTRUCTION**

- Jan 1928 - Dec 1977: 50% IFA Small Cap (SC) + 50% IFA Small Value (SV)
- Jan 1978 - Jan 1993: Dow Jones US Select REIT Index minus 0.020%/mo (mutual fund exp ratio)
- Feb 1993 - Jun 2008: DFA Real Estate Fund (DFREX)
- Jul 2008 - Present: DFA Global Real Estate Fund (DFGEX)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**

- 50% IFA Small Cap (SC) + 50% IFA Small Value (SV): Jan 1928 - Dec 1977: For Definitions see IFA Small Cap Index (SC) and IFA Small Value Index (SV) above.

**TIME-SERIES CONSTRUCTION**

- Jan 1978 - Jan 1993: Dow Jones Wilshire REIT Index minus 0.020%/mo (mutual fund exp ratio)
- Jan 1928 - Dec 1969: IFA Small Cap Index (SC)
- Jul 2008 - Present: DFA Global Real Estate Securities Portfolio (DFGEX): Jul 2008 - Present: The DFA Global Real Estate Securities Portfolio seeks to achieve exposure to a broad portfolio of securities of U.S. and non-U.S. companies in the real estate industry, with a focus on real estate investment trusts (“REITs”) or companies that the Advisor considers to be REIT-like entities. Actual performance results assume the reinvestment of dividends and capital gains.

### IFA International Value Index

**TIME-SERIES CONSTRUCTION**

- Jan 1928 - Jun 1955: IFA US Large Value Index (LV)
- Jul 1955 - Dec 1974: Dimensional UK Large Value Index (LV) minus 0.0358%/mo (mutual fund exp ratio)
- Mar 1994 - Present: DFA International Value Fund (DFVIX)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**


### IFA International Small Company Index

**TIME-SERIES CONSTRUCTION**

- Jan 1928 - Dec 1969: IFA Small Cap Index (SC)
- Jan 1970 - Sep 1996: Dimensional International Small Cap Index minus 0.042%/mo (mutual fund exp ratio)
- Oct 1996 - Present: DFA International Small Company Fund (DFISX)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**

- IFA Small Cap Index (SC): Jan 1928 - Dec 1969: For definition see IFA Small Cap Index (SC).
- Dimensional International Small Cap Index: January 1970 - June 1981: 50% Hoare Govett Small Companies Index (hgsmall.ind), 50% Nomura Small Companies Index (nomura.ind)
- July 1981 - December 1989: Created by Dimensional. Includes securities of MSCI EAFE countries in the bottom 10% of market capitalization, excluding the bottom 1%. All securities are market capitalization weighted. Each country is capped at 50%. Rebalanced semiannually.

January 1990 - Sep 1996: Dimensional International Small Cap Index: Market-capitalization-weighted index of small company securities in the eligible markets, excluding those with the lowest profitability and highest relative price within the small cap universe. Profitability is defined as operating income before depreciation and amortization minus interest expense divided by book equity. The index monthly returns are computed as the simple average of the monthly returns of four sub-indices, each one reconstituted once a year at the end of each quarter of the year. Maximum
index weight of any one company is capped at 5%. Countries currently included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and United Kingdom. Exclusions: REITs and Investment Companies Source: Bloomberg. The Dimensional International Small Cap Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to April 2008. Accordingly, the results shown during the periods prior to April 2008 do not represent actual returns of the index. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results. The calculation methodology for the Dimensional International Small Cap Index was amended in January 2014 to include profitability as a factor in selecting securities for inclusion in the index.

- **DFA International Small Company Fund (DFISX):** Oct 1996 - Present: The International Small Company Portfolio is a “fund of funds,” which means the Portfolio generally allocates its assets among other funds managed by Dimensional Fund Advisors LP (the “Advisor”) (the “Underlying Funds”), although it has the ability to invest directly in securities and derivatives. The International Small Company Portfolio seeks to achieve its investment objective of providing investors with access to securities portfolios consisting of a broad range of equity securities of primarily small Canadian, Japanese, United Kingdom, Continental European and Asia Pacific companies. Actual performance results assume the reinvestment of dividends and capital gains.

**ISV IFA International Small Cap Value Index**

**TIME-SERIES CONSTRUCTION**

- Jan 1928 - Dec 1969: IFA Small Cap Value (SV)
- Jul 1981 - Dec 1994: Dimensional Int'l Small Cap Value Index minus 0.0567%/mo (mutual fund exp ratio)
- Jan 1995 - Present: DFA Int'l Small Cap Value Fund (DISVX)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**

- **IFA Small Cap Value (SV):** Jan 1928 - Dec 1969: For definition see IFA Small Cap Value Index (SV).
- **Dimensional International Small Cap Value Index:** July 1981 - December 1989: Created by Dimensional. Includes securities, of MSCI EAFE countries, in the top 30% of Book-to-Market by market capitalization conditional on the securities being in the bottom 10% of market capitalization, excluding the bottom 1%. All securities are market capitalization weighted. Each country is capped at 50%. Rebalanced semiannually.

  January 1990 - Dec 1994: Dimensional International Small Cap Value Index: Consists of small cap companies in eligible markets whose relative price is in the bottom 35% of their country's respective constituents, after the exclusion of utilities and companies with either negative or missing relative price data. The index also excludes those companies with the lowest profitability within their country's small value universe. Profitability is defined as operating income before depreciation and amortization minus interest expense divided by book equity. The index monthly returns are computed as the simple average of the monthly returns of four sub-indices, each one reconstituted once a year at the end of each quarter of the year. Maximum index weight of any one company is capped at 5%. Countries currently included are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, and United Kingdom. Exclusions: REITs and Investment Companies. Source: Bloomberg.

The Dimensional International Small Cap Value Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to April 2008. Accordingly, the results shown during the periods prior to April 2008 do not represent actual returns of the Index. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results. The calculation methodology for the Dimensional International Small Cap Value Index was amended in 2014 to include profitability as a factor in selecting securities for inclusion in the index.

- **DFA International Small Cap Value Portfolio I (DISVX):** Jan 1995 - Present: The DFA International Small Cap Value Portfolio, using a market capitalization weighted approach, purchases securities of small, non-U.S. companies in countries with developed markets that Dimensional Fund Advisors LP (the “Advisor”) determines to be value stocks at the time of purchase. Actual performance results assume the reinvestment of dividends and capital gains.

**EM IFA Emerging Market Index**

**TIME-SERIES CONSTRUCTION**

- Jan 1928 - Dec 1969: 50% IFA US Large Value (LV) + 50% IFA US Small Cap (SC)
- Jan 1970 - Dec 1988: 50% IFA International Value (IV) + 50% IFA International Small (IS)
- Jan 1989 - Apr 1994: Fama/French Emerging Markets Index minus 0.045%/mo (mutual fund exp ratio)
- May 1994 - Present: DFA Emerging Markets Fund (DFEMQ)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**

- **50% IFA US Large Value Index (LV) + 50% IFA US Small Cap Index (SC):** Jan 1928 - Dec 1969: For definitions see IFA US Large Value (LV) and IFA US Small Cap (SC).
- **50% IFA International Value Index (IV) + 50% IFA International Small Index (IS):** Jan 1970 - Dec 1988: For definitions see IFA International Value Index (IV) and IFA International Small Index (IS).
- **DFA Emerging Markets Portfolio I (DFEMX):** May 1994 - Present: The Emerging Markets Portfolio pursues its investment objective by investing substantially all of its assets in the Emerging Markets Sector. The Emerging Markets Portfolio purchases a broad market coverage of larger companies associated with emerging markets, which may include frontier markets (emerging market countries in an earlier stage of development), authorized for investment by the Advisor's Investment Committee (“Approved Markets”). Actual performance results assume the reinvestment of dividends and capital gains.

**EV IFA Emerging Market Value Index**

**TIME-SERIES CONSTRUCTION**

- Jan 1928 - Dec 1969: IFA U.S. Small Cap Value Index (SV)
- Jan 1989 - Apr 1998: Dimensional Emerging Value Index minus 0.0475%/mo (mutual fund exp ratio)
- May 1998 - Present: DFA Emerging Markets Fund (DFENVX)
DEFINITIONS AND OTHER IMPORTANT INFORMATION

- Dimensional Emerging Value Index: January 1989 - Apr 1998: Consists of companies whose relative price is in the bottom 33% of their country's respective constituents, after the exclusion of utilities and companies with either negative or missing relative price data. The index emphasizes companies with smaller capitalization, lower relative price, and higher profitability. The index also excludes those companies with the lowest profitability and highest relative price within their country's small value universe. Profitability is defined as operating income before depreciation and amortization minus interest expense divided by book equity. The index monthly returns are computed as the simple average of the monthly returns of four sub-indices, each one reconstituted once a year at the end of each quarter of the year. Maximum index weight of any one company is capped at 5%. Countries currently included are Brazil, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Russia, South Africa, South Korea, Taiwan, Thailand, and Turkey. Exclusions: REITs and Investment Companies. Actual and backtested performance results assume the reinvestment of dividends and capital gains. Source: Bloomberg.
- DFA Emerging Markets Value Portfolio I (DFEVX): May 1998 - Present: The Emerging Markets Value Portfolio pursues its investment objective by investing substantially all of its assets in the Emerging Markets Value Fund. The Emerging Markets Value Fund purchases emerging market equity securities that are deemed by the Advisor to be value stocks at the time of purchase and associated with emerging markets, which may include frontier markets (emerging market countries in an earlier stage of development), authorized for investment by the Advisor's Investment Committee ("Approved Markets"). Actual performance results assume the reinvestment of dividends and capital gains.

IFA Emerging Market Small Cap Index

TIME-SERIES CONSTRUCTION

- Jan 1928 - Dec 1969: IFA U.S. Small Cap Index (SC)
- Jan 1989 - Mar 1998: Fama/French Emerging Markets Small minus 0.0608%/mo (mutual fund exp ratio)

DEFINITIONS AND OTHER IMPORTANT INFORMATION

- DFA Emerging Markets Small Cap Portfolio I (DEMSX): Apr 1998 - Present: The Emerging Markets Small Cap Portfolio pursues its investment objective by investing substantially all of its assets in the Emerging Markets Small Cap Series. The Emerging Markets Small Cap Series purchases a broad market coverage of smaller companies associated with each emerging market, which may include frontier markets (emerging market countries in an earlier stage of development), authorized for investment by the Advisor's Investment Committee ("Approved Markets"). Actual performance results assume the reinvestment of dividends and capital gains.

IFA One-Year Fixed Income Index

TIME-SERIES CONSTRUCTION

- Jan 1928 - Jun 1963: One-Month T-Bills minus 0.0142%/mo (mutual fund exp ratio)
- Jul 1963 - Sep 1983: ICE BofAML 1-Year US Treasury Note Index minus 0.0142%/mo (mutual fund exp ratio)
- Aug 1983 - Present: DFA U.S. One Year Fixed Income Fund (DFIHX)

DEFINITIONS AND OTHER IMPORTANT INFORMATION

- ICE BofAML 1-Year US Treasury Note Index: July 1963 - Jul 1983: Actual and backtested performance results assume the reinvestment of earnings. CRSP/DFA. Total Returns in USD. Source: ICE Data Indices, LLC GC03 Index. Currency: USD. ICE BofAML index data copyright 2018 ICE Data Indices, LLC.
- DFA One-Year Fixed Income Portfolio (DFIHX): Aug 1983 - Present: The One-Year Portfolio seeks to achieve its investment objective by generally investing in a universe of high quality fixed income securities that typically mature in one year or less. The Portfolio may, however, take a large position in securities maturing within two years of the date of settlement when higher yields are available. The One-Year Portfolio invests in U.S. government obligations, U.S. government agency obligations, dollar denominated obligations of foreign issuers issued in the U.S., securities of domestic or foreign issuers denominated in U.S. dollars but not trading in the U.S., foreign government and agency obligations, bank obligations, including U.S. subsidiaries and branches of foreign banks, corporate obligations, commercial paper, repurchase agreements and obligations of supranational organizations. Actual performance results assume the reinvestment of earnings.

IFA Two-Year Global Fixed Income Index

TIME-SERIES CONSTRUCTION

- Jan 1928 - Jun 1977: Five-Year T-Notes minus 0.0142%/mo (mutual fund exp ratio)
- Jul 1977 - Dec 1989: ICE BofAML US Treasury Index 1-3 Year minus 0.0142%/mo
- Jan 1990 - Feb 1996: FTSE World Government Bond Index 1-3 Years (hedged to USD) minus 0.0142%/mo
- Mar 1996 - Present: DFA 2-Year Global Fixed Income Fund (DFGFX)

DEFINITIONS AND OTHER IMPORTANT INFORMATION


• FTSE World Government Bond Index 1-3 Years (hedged to USD): January 1990 - Feb 1996: FTSE World Government Bond Index 1-3 Years (hedged to USD) Total Returns Hedged to USD. Actual and backtested performance results assume the reinvestment of earnings. Source: FTSE. Currency: USD. Citi fixed income indices copyright 2018 by Citigroup.


### IFA Short Term Government Index

#### TIME-SERIES CONSTRUCTION
- Jan 1928 - Dec 1972: Five-Year T-Notes minus 0.00158%/mo (mutual fund exp ratio)
- Jul 1987 - Present: DFA Short-Term Government Portfolio (DFGGX)

#### DEFINITIONS AND OTHER IMPORTANT INFORMATION
- **DFA Short-Term Government Portfolio (DFGGX)**: Jul 1987 - Present: The Short-Term Government Portfolio seeks to maximize risk-adjusted total returns from a universe of obligations of the U.S. Government and its agencies maturing in five years or less. The credit quality of the securities purchased by the Portfolio will be that of the U.S. Government or its agencies. Actual performance results assume the reinvestment of earnings.

### IFA Five-Year Global Fixed Income Index

#### TIME-SERIES CONSTRUCTION
- Jan 1928 - Dec 1984: IFA Short Term Government Index (3G)
- Jan 1985 - Nov 1990: Global Government Bond Composite Index (hedged Citi) minus 0.0225%/mo (mutual fund exp ratio)
- Dec 1990 - Present: DFA Five-Year Global Fixed Income Fund (DFGFX)

#### DEFINITIONS AND OTHER IMPORTANT INFORMATION
- **IFA Short Term Government Index (3G)**: Jan 1928 - Dec 1984: For definition see IFA Short Term Government Index (3G).
- **DFA Five-Year Global Fixed Income Portfolio (DFGFX)**: Dec 1990 - Present: The Five-Year Global Portfolio seeks to achieve its investment objective by generally investing in a universe of U.S. and foreign debt securities maturing in five years or less. The Five-Year Global Portfolio primarily invests in obligations issued or guaranteed by the U.S. and foreign governments, their agencies and instrumentalities, corporate debt obligations, bank obligations, commercial paper, repurchase agreements, obligations of other domestic and foreign issuers, securities of domestic or foreign issuers denominated in U.S. dollars but not trading in the United States, and obligations of supranational organizations. Actual performance results assume the reinvestment of earnings.

### Sim. S&P 500® Index

#### TIME-SERIES CONSTRUCTION
- Jan 1928 - Dec 1990: Dimensional US Large Cap Index Minus 0.00167%/mo (mutual fund exp ratio)
- Jan 1991 - Apr 2010: DFA U.S. Large Company Fund
- May 2010 - June 2017: DFA U.S. Large Company Fund (DFUSX)
- July 2017 - Present: Schwab S&P 500 Index (SWPPX)

#### DEFINITIONS AND OTHER IMPORTANT INFORMATION
- **Dimensional US Large Cap Index**: January 1928 - Dec 1990: Dimensional US Large Cap Index Composition: Market-capitalization-weighted index of securities of the largest U.S. companies whose market capitalization falls in the highest 50% of the total market capitalization of the Eligible Market. The Eligible Market is composed of securities of U.S. companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITs, and Investment Companies. Source: CRSP and Compustat.

The Dimensional US Large Cap Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to March 1st, 2007. Accordingly, the results shown during the periods prior to March 1st, 2007 do not represent actual returns of the Index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstituted once a year at the end of each month of the year. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results.

- **DFA U.S. Large Company Fund**: Jan 1991 - April 2010: The U.S. Large Company Portfolio generally invests in the stocks that comprise the S&P 500® Index in approximately the proportions they are represented in the S&P 500® Index. The S&P 500® Index comprises a broad and diverse group of stocks. Generally, these are the U.S. stocks with the largest market capitalizations and, as a group, they generally represent approximately 80% of the total market capitalization of all publicly traded U.S. stocks. Actual performance results assume the reinvestment of dividends and capital gains. Fund is closed.
**IFA World Index**

**TIME-SERIES CONSTRUCTION**
- Jan 1928 - Present: Fama/French US Small Growth Simulated Portfolio (ex Utilities)
- Feb 1973 - Sep 2003: NASDAQ Composite Index
- Oct 2003 - Present: Nasdaq Composite Total Return (XCMP) (Source: Morningstar)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**

**IFA NSDQ Index**

**TIME-SERIES CONSTRUCTION**
- Feb 1973 - Sep 2003: NASDAQ Composite Index
- Oct 2003 - Present: Nasdaq Composite Total Return (XCMP)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**
- **NASDAQ Composite Index**: Feb 1973 - Sep 2003: The Nasdaq Composite Index is the market capitalization-weighted index of common equities listed on the Nasdaq stock exchange. The types of securities in the index include American depositary receipts, common stocks, real estate investment trusts (REITs) and tracking stocks, as well as limited partnership interests.
- **Nasdaq Composite Total Return (XCMP)**: Oct 2003 - Present: The Nasdaq Composite Index is the market capitalization-weighted index of common equities listed on the Nasdaq stock exchange. The types of securities in the index include American depositary receipts, common stocks, real estate investment trusts (REITs) and tracking stocks, as well as limited partnership interests.

**IFA U.S. Total Market Index**

**TIME-SERIES CONSTRUCTION**
- Jan 1928 - Apr 1992: Dimensional US Market Index minus 0.0029%/mo (mutual fund exp ratio)
- May 1992 - Present: Vanguard US Total Market Index Instl (VITKS)

**DEFINITIONS AND OTHER IMPORTANT INFORMATION**
- **Dimensional US Market Index**: January 1928 - Apr 1992: Dimensional US Market Index Composition: Market-capitalization-weighted index of securities of all US companies. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITs, and Investment Companies Source: CRSP and Compustat The Dimensional US Market Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to March 1st, 2007. Accordingly, the results shown during the periods prior to March 1st, 2007 do not represent actual returns of the Index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstituted once a year at the end of each month of the year. The Index is unmanaged and is not subject to fees and expenses typically associated with managed accounts or investment funds. Investments cannot be made directly in an index. Past performance is no guarantee of future results.
- **Vanguard US Total Market Index (VITKS)**: May 1992 - Present: The investment seeks to track the performance of a benchmark index that measures the investment return of the overall stock market. The fund employs a passive management strategy designed to track the performance of the MSCI US Broad Market index, which consists of all the U.S. common stocks traded regularly on the New York Stock Exchange and the Nasdaq over-the-counter market. It typically holds 1,200-1,300 of the stocks in its target index. Actual performance results assume the reinvestment of dividends and capital gains.
IFA U.S. Large Growth Index

TIME-SERIES CONSTRUCTION
- Jan 1928 - Dec 1974: Dimensional US Large Cap High Price-to-Book Index minus 0.0033%/mo (mutual fund exp ratio)
- Jan 1975 - Nov 1992: Dimensional US Large Growth Index minus 0.0033%/mo
- Dec 1992 - Present: Vanguard Growth Index Instl (VIGIX)

DEFINITIONS AND OTHER IMPORTANT INFORMATION
- **Dimensional US Large Cap High Price-to-Book Index**: January 1928 - Dec 1974: Dimensional US Large Cap High Price-to-Book Index Composition: A subset of the US Large Cap Index. The subset is defined as companies whose relative price is in the top 20% of the US Large Cap Index after the exclusion of utilities, companies lacking financial data, and companies with negative relative price. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITs, and Investment Companies Source: CRSP and Compustat.

Prior to February 2013 the name of this returns series was Dimensional US Large Cap Growth Index. The Dimensional US Large Cap High Price-to-Book Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to March 1st, 2007. Accordingly, the results shown during the periods prior to March 1st, 2007 do not represent actual returns of the Index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstituted once a year at the end of each month of the year. The index is unmanaged however a mutual fund expense ratio has been deducted from the index returns. Investments cannot be made directly in an index. Past performance is no guarantee of future results.

- **Dimensional US Large Growth Index**: January 1975 - Nov 1992: Dimensional US Large Cap Growth Index Composition: Consists of companies with market capitalizations above the 1000th name whose relative price is in the top 50% of the all large cap companies after the exclusion of utilities, companies lacking financial data, and companies with negative relative price. The Index emphasizes companies with higher profitability, lower relative price, and lower market capitalization. Profitability is defined as operating income before depreciation and amortization minus interest expense divided by book equity. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITs, and Investment Companies Source: CRSP and Compustat. The Dimensional US Large Cap Growth Index has been retrospectively calculated by Dimensional Fund Advisors and did not exist prior to December 31st, 2012. Accordingly, the results shown during the periods prior to December 31st, 2012 do not represent actual returns of the Index. Other periods selected may have different results, including losses. Backtested index performance is hypothetical and is provided for informational purposes only to indicate historical performance had the index been calculated over the relevant time periods. Actual and backtested performance results assume the reinvestment of dividends and capital gains. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstituted once a year at the end of each month of the year. The index is unmanaged and is not subject to fees and expenses typically associated with managed accounts or investment funds. Investments cannot be made directly in an index. Past performance is no guarantee of future results.

- **Vanguard Growth Index (VIGIX)**: Dec 1992 - Present: The investment seeks to track the performance of a benchmark index that measures the investment return of large-capitalization growth stocks. The fund employs a passive management investment approach designed to track the performance of the MSCI US Prime Market Growth Index, a broadly diversified index of growth stocks of large U.S. companies. It attempts to replicate the target index by investing all, or substantially all, of assets in the stocks that make up the index, holding each stock in approximately the same proportion as its weighting in the index. Actual performance results assume the reinvestment of dividends and capital gains.

IFA U.S. Small Growth Index

TIME-SERIES CONSTRUCTION
- Jan 1928 - May 1998: Fama/French Small Growth Research Index minus 0.005%/mo (mutual fund exp ratio)
- Jun 1998 - Present: Vanguard Small-Cap Growth Index Instl (VSGIX)

DEFINITIONS AND OTHER IMPORTANT INFORMATION
- **Fama/French Small Growth Research Index**: Jan 1928 - May 1998: Composition: The index portfolios for July of any given year to June of the following year include all NYSE, AMEX, and NASDAQ stocks for which we have market equity for December of the prior year and June of the given year, and (positive) book-to-market equity data for fiscal year ending in the prior year. Exclusions: ADRs, Investment Companies, Tracking Stocks, non-US incorporated companies, Closed-end funds, Certificates, Shares of Beneficial Interests, and negative book values. Sources: CRSP databases for returns and market capitalization: 1926 - present. Compustat and hand-collected book values: 1926 - present. CRSP links to Compustat and hand-collected links: 1926 - present. Breakpoints: The size breakpoint is the market capitalization of the median NYSE firm, so the big and small categories contain the same number of eligible NYSE firms. The BtM breakpoints split the eligible NYSE firms with positive book equity into three categories: 30% of the eligible NYSE firms with positive BE are in Low (Growth), 40% are in Medium (Neutral), and 30% are in High (Value). Rebalancing: Annual (at the end of June) 1926-Present. Actual and backtested performance results assume the reinvestment of dividends and capital gains. Currency: USD Fama/French and multifactor data provided by Fama/French.

- **Vanguard Small-Cap Growth Index (VSGIX)**: Jun 1998 - Present: The investment seeks to track the performance of a benchmark index that measures the investment return of small capitalization growth stocks. The fund employs a passive management investment approach designed to track the performance of the MSCI US Small Cap Growth Index, a broadly diversified index of growth stocks of smaller U.S. companies. It attempts to replicate the target index by investing all, or substantially all, of assets in the stocks that make up the index, holding each stock in approximately the same proportion as its weighting in the index. Actual performance results assume the reinvestment of dividends and capital gains.
Dimensional US Small Cap Index

DEFINITIONS AND OTHER IMPORTANT INFORMATION

• Dimensional US Small Cap Index: was created by Dimensional in March 2007 and is compiled by Dimensional. It represents a market-capitalization-weighted index of securities of the smallest US companies whose market capitalization falls in the lowest 8% of the total market capitalization of the Eligible Market. The Eligible Market is composed of securities of US companies traded on the NYSE, NYSE MKT (formerly AMEX), and Nasdaq Global Market. Exclusions: Non-US companies, REITs, UITS, and investment companies. From January 1975 to the present, the index also excludes companies with the lowest profitability and highest relative price within the small cap universe. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Source: CRSP and Compustat. The index monthly returns are computed as the simple average of the monthly returns of 12 sub-indices, each one reconstituted once a year at the end of a different month of the year. The calculation methodology for the Dimensional US Small Cap Index was amended on January 1, 2014, to include profitability as a factor in selecting securities for inclusion in the index. Actual and backtested performance results assume the reinvestment of dividends and capital gains.

Dimensional US High Profitability Index

DEFINITIONS AND OTHER IMPORTANT INFORMATION

• Dimensional US High Profitability Index: was created by Dimensional in January 2014 and represents an index consisting of US companies. It is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups yield nine subgroups formed on profitability and relative price. The index represents the average return of the three high-profitability subgroups. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Source: CRSP and Compustat. Actual and backtested performance results assume the reinvestment of dividends and capital gains.

Dimensional International Small Cap Index

DEFINITIONS AND OTHER IMPORTANT INFORMATION

• Dimensional International Small Cap Index: was created by Dimensional in April 2008 and is compiled by Dimensional. July 1981–December 1993: It includes non-US developed securities of the bottom 10% of market capitalization in each eligible country. All securities are market-capitalization weighted. Each country is capped at 50%. Rebalanced semiannually, January 1994–Present: Market-capitalization-weighted index of small company securities in the eligible markets excluding those with the lowest profitability and highest relative price within the small cap universe. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. The index monthly returns are computed as the simple average of the monthly returns of four sub-indices, each one reconstituted once a year at the end of a different quarter of the year. Prior to July 1981, the index is 50% UK and 50% Japan. The calculation methodology for the Dimensional International Small Cap Index was amended on January 1, 2014, to include profitability as a factor in selecting securities for inclusion in the index. Actual and backtested performance results assume the reinvestment of dividends and capital gains.

Dimensional International Low Profitability Index

DEFINITIONS AND OTHER IMPORTANT INFORMATION

• Dimensional International Low Profitability Index: was created by Dimensional in January 2013 and represents an index consisting of non-US developed companies. It is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization of each eligible country. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups yield nine subgroups formed on profitability and relative price. The index represents the average return of the three low-profitability subgroups. The index is rebalanced twice per year. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Source: Bloomberg. Actual and backtested performance results assume the reinvestment of dividends and capital gains.

Dimensional International High Profitability Index

DEFINITIONS AND OTHER IMPORTANT INFORMATION

• Dimensional International High Profitability Index: was created by Dimensional in January 2013 and represents an index consisting of non-US developed companies. It is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization of each eligible country. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups yield nine subgroups formed on profitability and relative price. The index represents the average return of the three high-profitability subgroups. The index is rebalanced twice per year. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Source: Bloomberg. Actual and backtested performance results assume the reinvestment of dividends and capital gains.

Dimensional Emerging Markets High Profitability Index

DEFINITIONS AND OTHER IMPORTANT INFORMATION

• Dimensional Emerging Markets High Profitability Index: was created by Dimensional in April 2013 and represents an index consisting of emerging markets companies and is compiled by Dimensional. Dimensional sorts stocks into three profitability groups from high to low. Each group represents one-third of the market capitalization of each eligible country. Similarly, stocks are sorted into three relative price groups. The intersections of the three profitability groups and the three relative price groups yield nine subgroups formed on profitability and relative price. The index represents the average return of the three high-profitability subgroups. The index is rebalanced twice per year. Profitability is measured as operating income before depreciation and amortization minus interest expense scaled by book. Source: Bloomberg. Actual and backtested performance results assume the reinvestment of dividends and capital gains.