

Comparing Performance of Dimensional Funds vs. Index Funds

September 2024

- For the period analyzed, DFA's largest US-oriented funds underperformed both fine-tuned index clones and simple index fund comparables. Any contribution from active management appears to be negative.
- DFA's largest non-US-oriented funds outperformed equivalent index funds.
- For some international factors such as emerging markets value, index funds equivalent to DFA funds are simply not available.
- Variation in DFA's fund performance might be explained by the efficient market hypothesis.

Introduction

Dimensional Fund Advisors (also known as Dimensional or DFA) has offered mutual funds since 1981.

DFA's investment strategy concentrates on factor analysis (large cap, mid cap, small cap; value, growth, blend; etc.). DFA's marketing materials

describe a scientific approach to investing, which it refers to as "financial science." DFA uses Nobel prize winning work by Eugene Fama and others. DFA has listed multiple Nobel prize winning economists as advisors.

DFA offers 103 share classes of US-oriented and non-US oriented funds including equity funds and fixed-income funds. As of September 2024, DFA

has approximately \$400 billion in assets under management.¹

DFA's marketing strategy has traditionally been to sell its funds only through financial advisors who qualify through a special process to become eligible to sell DFA funds.

Because DFA funds have not been available to retail investors, financial advisors who sell DFA funds have presented their access to DFA funds as a benefit to their clients.

DFA's strategy resulted in growth for decades, but the appeal of the strategy waned over time, and by 2020 DFA experienced \$38 billion in outflow from its funds.²

In November 2020, DFA began offering ETFs to retail investors.

This analysis focuses on DFA's traditional proprietary funds that are not available to retail investors. It seeks to determine what benefit, if any, investors realize through access to DFA's traditional funds.

Index Fund Comparison

Many investment professionals, including Rain Dog, believe that most of a fund's performance comes from asset allocation, i.e., most performance arises from the broad categories of the stocks in a portfolio, such as large cap growth, small cap value, and so on. Selection of the

specific stocks in a portfolio adds little value, and in many cases subtracts value vs. what could be obtained by investing generically in the same asset classes. Index funds provide superior results because they allow investors to invest in the desired asset classes while eliminating the expense associated with active stock picking.

Rain Dog's belief in the superiority of index funds was supported by the most recent *SPIVA U.S. Scorecard* from S&P Global, which reported that 75% of actively managed US equity funds underperformed their relevant benchmarks (aka indexes) in 2023.³ Even more significant, 95% of actively managed US equity funds underperformed their benchmarks over the 10-year period ending in 2023 on a risk-adjusted basis. This basic pattern has been true for decades.⁴

Methodology

This analysis compares performance of DFA's traditional proprietary funds to comparable index funds for the purpose of determining whether access to DFA funds (through a qualified advisor) provides any meaningful benefit to retail investors beyond what could be obtained from investments in similar index funds.

For this analysis, Rain Dog selected DFA funds that had assets of at least \$10 billion as of September 2024. These are the funds that met that criteria.⁵

¹ Morningstar.com as of September 10, 2024.

² Gabe Albert, "Active ETF Investors Flock to DFA Funds," morningstar.com, May 10, 2024.

³ "SPIVA® U.S. Scorecard, Year-End 2023," S&P Global, 2024.

⁴ "The Arithmetic of Active Management," *Financial Analysts Journal*, William F. Sharpe, 1991.

⁵ Morningstar.com as of September 10, 2024.

- DFA US Core Equity 1 I (DFEOX), 33.8bn
- DFA US Core Equity 2 I (DFQTX), 32.5bn
- DFA International Core Equity I (DFIEX), 31.4bn
- DFA Emerging Markets Core Equity I (DFCEX), 27.2bn
- DFA US Large Cap Value I (DFLVX), 24.1bn
- DFA US Small Cap Value I (DFSVX), 15.6bn
- DFA US Small Cap I (DFSTX), 15.6bn
- DFA US Targeted Value I (DFFVX), 12.9bn
- DFA International Small Company I (DFISX), 12.4bn
- DFA Investment Grade I (DFAPX), 12.1bn
- DFA US Large Company I (DFUSX), 11.7bn
- DFA International Small Cap Value I (DISVX), 11.2bn
- DFA Emerging Markets Value I (DFEVX), 10.6bn

A set of factor-oriented index funds were selected for comparison purposes. Here are the funds that were used for this analysis:

- Large cap blend index (VFIAX)
- Large cap value index (VVIAX)
- Large cap growth index (VIGAX)
- Mid cap blend index (VIMAX)
- Mid cap value index (VMVIX)
- Mid cap growth index (VMGIX)
- Small cap blend index (VSMAX)
- Small cap value index (VISVX)
- Small cap growth index (VISGX)
- International stocks–total market (VGTSX)

- International stocks–Europe (VEUSX)
- International stocks–developed countries, ex-US (VTMGX)
- International stocks–small cap, ex-US (VFSNX)
- International stocks–emerging markets (VEMAX)
- International stocks–emerging markets value (DEM)
- International stocks–emerging markets small cap value (DGS)
- Total international bond market (VTABX)
- Short-term tax exempt bonds (VWSTX)
- Long-term corporate bonds (VWETX)

Additional funds were analyzed as candidates in creating the index clones described below. Funds that were not ultimately selected as comparables have not been listed here.

Fund Matching Method

For each DFA fund, a clone comprised of one or more index funds was created by matching the five factors from Fama & French’s five factor model. The five factors are:

- Excess returns
- Small vs. large
- Value vs. growth
- Profitability
- Investment

Portfolio Visualizer’s “Match Factor Exposures” tool⁶ was used to identify index fund clones for each DFA fund. Rain Dog’s analysis used equal weighting for the five factors and a maximum of eight funds for each clone.

Portfolio Visualizer’s Match Factor Exposures tool provides two matching portfolios: a Factor Exposure Clone and a Returns Based Clone. This analysis used the Factor Exposure Clones.

Performance Period

The time period used for this analysis was the most recent complete 10-year period, i.e., January 1, 2014 through December 31, 2023.

Performance analysis of DFA’s largest fund

Using the factor-exposure-match methodology described earlier, DFA’s largest fund (DFEEX) was cloned with index funds. The table below shows the closest factor-based match to index funds.

Index Funds	Allocation
VFIAX	63.82%
VISVX	33.15%
VIGAX	3.03%

The performance of the DFA fund and its index fund clone is shown in the table below.

	DFEEX	Index Funds
CAGR	10.92%	10.96%
Standard Deviation	16.17%	16.20%
Sharpe Ratio	0.65	0.65
Sortino Ratio	0.99	0.99

Regardless of the sophistication of the techniques DFA used to select stocks for its fund, the data shows that performance of the DFA fund was almost identical to index funds with the same asset allocation. In other words, performance of the DFA fund can be fully explained by its asset allocation; active stock picking did not add any value.

Analysis of additional DFA funds compared to index fund clones

This analysis was repeated for the other 12 DFA funds that met the criteria for participating in this analysis. The results are shown in Table 1 on the next page.

For purposes of deciding which fund had better performance, Sharpe and Sortino ratios were used. Differences of 0.01 and smaller were considered not to be significant.

⁶ All historical performance numbers were calculated using Portfolio Visualizer (portfoliovisualizer.com).

Table 1 Summary of differences between DFA funds and index fund clones

Investment Style	Fund	Returns		Std Dev		Sharpe		Sortino		Winner
		DFA	Index	DFA	Index	DFA	Index	DFA	Index	
US Equity Total Market	DFEOX	10.92%	10.96%	16.17%	16.20%	0.65	0.65	0.99	0.99	-
US Equity Total Market-- Small Cap Bias	DFQTX	10.32%	10.56%	16.51%	16.55%	0.60	0.62	0.92	0.93	Index
International Developed Markets	DFIEX	4.72%	4.08%	16.24%	16.30%	0.29	0.25	0.44	0.36	DFA
Emerging Markets--Total Market	DFCEX	4.00%	3.53%	17.26%	16.22%	0.24	0.22	0.36	0.32	DFA
US Large & Mid Cap Value	DFLVX	8.33%	8.69%	17.33%	16.53%	0.48	0.51	0.71	0.75	Index
US Small Cap	DFSTX	8.07%	8.34%	19.64%	19.38%	0.43	0.45	0.64	0.66	Index
US Small Cap Value	DFSVX	7.99%	8.36%	21.99%	19.56%	0.40	0.45	0.60	0.66	Index
US Small Cap Value--Mid Cap Bias	DFFVX	8.51%	8.36%	21.77%	19.56%	0.43	0.45	0.64	0.66	Index
International Small Cap	DFISX	4.94%	4.18%	16.83%	16.54%	0.30	0.26	0.43	0.37	DFA
US Large Cap	DFUSX	11.97%	12.00%	15.19%	15.19%	0.74	0.74	1.15	1.16	-
International Small Cap Value	DISVX	4.62%	3.60%	17.59%	16.57%	0.28	0.22	0.39	0.32	DFA
Emerging Markets Value	DFEVX	3.74%	2.96%	18.18%	17.56%	0.22	0.18	0.33	0.27	DFA
Intermediate Core Bonds	DFAPX	2.24%	2.48%	5.02%	4.75%	0.22	0.28	0.32	0.41	Index

The overall results shown in Table 1 are effectively a tie. Of the 13 funds analyzed, index clones were superior in 6 instances, DFA funds were superior in 5 instances, and 2 instances were ties.

Single fund comparisons

The preceding analysis involved carefully constructing index fund clones that closely replicated the factor exposure of each DFA fund. However, some advisors might not go to the

trouble to replicate a DFA fund with more than one index fund. A more practical comparison would be to compare each of DFA's 13 largest funds with the single closest index fund.

Consequently, a second analysis was conducted in which each DFA fund was compared to the most similar index fund over the 10 year period from January 1, 2014 through December 31, 2023. The results are shown in Table 2 on the next page.

Table 2 Summary of differences between DFA funds and closest single index fund

Investment Style	Fund		Returns		Std Dev		Sharpe		Sortino		Clear Winner?
	DFA	Index	DFA	Index	DFA	Index	DFA	Index	DFA	Index	
US Equity Total Market	DFEOX	VTSAX	10.92%	11.43%	16.17%	15.60%	0.65	0.69	0.99	1.07	Index
US Equity Total Market-- Small Cap Bias	DFQTX	VTSAX	10.32%	11.43%	16.51%	15.60%	0.60	0.69	0.92	1.07	Index
International Developed Markets	DFIEX	VTMGX	4.72%	4.54%	16.24%	15.68%	0.29	0.28	0.44	0.42	DFA
Emerging Markets--Total Market	DFCEX	VEMAX	4.00%	2.97%	17.26%	16.73%	0.24	0.18	0.36	0.27	DFA
US Large & Mid Cap Value	DFLVX	VVIAX	8.33%	9.73%	17.33%	14.64%	0.48	0.62	0.71	0.96	Index
US Small Cap	DFSTX	VSMAX	8.07%	8.45%	19.64%	18.98%	0.43	0.46	0.64	0.68	Index
US Small Cap Value	DFSVX	VISVX	7.99%	8.49%	21.99%	19.56%	0.40	0.45	0.60	0.66	Index
US Small Cap Value--Mid Cap Bias	DFVFX	VISVX	8.51%	8.49%	21.77%	19.56%	0.43	0.45	0.64	0.66	Index
International Small Cap	DFISX	VFSNX	4.94%	3.91%	16.83%	16.79%	0.30	0.24	0.43	0.34	DFA
US Large Cap	DFUSX	VFIAX	11.97%	11.99%	15.19%	15.17%	0.74	0.74	1.15	1.16	-
International Small Cap Value	DISVX	No direct comparison	4.62%		17.59%		0.28		0.39		DFA*
Emerging Markets Value	DFEVX	No direct comparison	3.74%		18.18%		0.22		0.33		DFA*
Intermediate Core Bonds	DFAPX	VBILX	2.24%	2.29%	5.02%	5.49%	0.22	0.21	0.32	0.31	-

*No direct single-fund exists that is comparable to the DFA fund.

The results of this analysis tracked the overall results of the more fine-grained index-clone analysis for each of the DFA funds.

DFA's strengths and weaknesses

For both the fine-grain comparison and simpler comparison, in 6 instances the comparable index funds performed better; in 5 instances the DFA funds performed better; and in 2 instances performance was tied.

That broad comparison misses an important pattern, however. For US-oriented funds, index funds either outperformed DFA funds or tied. For non-US funds, DFA funds outperformed index funds.

For investments in US-based companies, this analysis found that the largest DFA funds do not offer any advantage and, depending on the specific comparison, sometimes significantly underperformed their index-fund counterparts.

For investments outside the US, this analysis found that the largest DFA funds outperformed

index funds, usually significantly, and, in some cases, offered exposure to factors that are not available in index funds.

The bottom line of this analysis is that U.S.-oriented investors will not realize more benefit from investing in DFA's largest funds than they would realize from investing in comparable index funds.

Investors who seek exposure to factor-oriented investing in companies outside the United States may realize significant benefit from investing in DFA's largest international funds.

Speculation about DFA's strengths and weaknesses

DFA's DNA is about factor-based investing, yet its US-oriented factor-oriented funds did not outperform their comparison index funds. Why is this?

Rain Dog speculates that the variation in DFA's fund performance might be explained by the efficient market hypothesis.⁷ For markets in which

information flows freely, such as US stocks and bonds, DFA has no special knowledge to leverage, and therefore performance of its funds does not surpass index funds. For markets in which information is less available—such as international small companies and emerging markets—DFA may be able to develop insights that support factor investing, and that may enable its funds to outperform index funds.

Conclusions

This analysis found that investors in US-oriented funds are better served by investing in index funds rather than DFA's largest funds. However, investors in non-US oriented funds may benefit from investing in DFA's largest international funds rather than comparable index funds.

That said, the days of DFA's proprietary funds may be waning, because each of DFA's largest international funds now have an ETF counterpart that is available to retail investors. Investors can access these funds with or without the assistance of an advisor who sells DFA's proprietary funds.

⁷ The Efficient Market Hypothesis (EMH) states that information that affects the price of a stock is already known to the market and has been factored into the price. The EMH has three forms. The *weak form* of the EMH states that all past prices are factored into current prices; therefore, technical analysis cannot be used to select stocks that will perform better than the market. The *semi-strong form* of the EMH states that all publicly available information has been considered and has been factored into stock prices; therefore, fundamental analysis also cannot be used to pick stocks that will outperform the market. The *strong form* of the EMH states that all public and private information has been factored into the stock's price; therefore it is not possible to beat the market by stock picking other than through random chance.

Appendix: Composition of Index Fund Clones

DFA US Core Equity 1 (DFEOX)

Index Funds	Allocation
VFIAX	63.82%
VISVX	33.15%
VIGAX	3.03%

DFA US Core Equity 2 I (DFQTX)

Index Funds	Allocation
VFIAX	57.32%
VISVX	42.68%

DFA International Core Equity I (DFIEX)

Index Funds	Allocation
VFSNX	51.98%
VEUSX	38.66%
VEMAX	8.83%

DFA Emerging Markets Core Equity I (DFCEX)

Index Funds	Allocation
VEMAX	44.11%
DEM	23.27%
VFSNX	12.08%
VTMGX	11.65%
DGS	8.88%

DFA US Large Cap Value I (DFLVX)

Index Funds	Allocation
VMVIX	77.33%
VVIAX	22.67%

DFA US Small Cap I (DFSTX)

Index Funds	Allocation
VISVX	90.59%
VISGX	9.41%

DFA US Small Cap Value I (DFSVX)

Index Funds	Allocation
VISVX	100.0%

DFA US Targeted Value I (DFFVX)

Index Funds	Allocation
VISVX	100.0%

DFA International Small Company I (DFISX)

Index Funds	Allocation
VFSNX	76.97%
DGS	23.03%

DFA US Large Company I (DFUSX)

Index Funds	Allocation
VFIAX	99.81%
VIGAX	0.13%
VMGIX	0.06%

DFA Emerging Markets Value I (DFEVX)

Index Funds	Allocation
DEM	83.92%
VEMAX	12.35%
VFSNX	3.73%

International Small Cap Value Portfolio I (DISVX)

Index Fund	Allocation
VFSNX	55.90%
DEM	44.10%

DFA Investment Grade I (DFAPX)

Index Funds	Allocation
VTABX	53.30%
VWSTX	24.59%
VWETX	22.11%



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