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RESEARCH
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Benchmarking Core U.S. Equities

The "Core-Satellite" method of portfolio allocation seems to have a well-established following, maybe because of its intuitive, sensible framework. Its basic tenets include creation of two high-level investment sleeves. The first is the larger "core" comprising low cost index funds and designed to anchor a portfolio to market beta and the second is the smaller "satellite" allocation comprising vehicles expected to generate portfolio alpha in excess of their higher fees. However, there is not universal consensus on precisely what should constitute the core and satellite sleeves.

The mainstream view holds that asset classes deemed to be more efficient, such as large-cap stocks, ought to make up the core. But an alternative view is that the efficacy of passive investing is not related to market efficiency, and therefore indexing is a solid default strategy for all asset classes, unless an investor possesses particular skill in manager selection.[1] History has certainly shown that indexing mid- and small-cap stocks has been just as effective as indexing large caps—a notion we will further discuss in this paper.

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Another issue in core-satellite portfolio construction is how to optimize use of scarce research resources. Since core investments are generally plain vanilla index funds, which are thought to be well-understood, proper attention can be diverted from the core when resources are primarily applied to selection of satellite investments. In other words, investors may have a false sense of confidence in their understanding of what the make-up of a core allocation should be. In reality, many may be uncritically accepting the misleading mainstream view. This is unfortunate because while satellite investments demand a great deal of due diligence and analysis, most risk and return will ultimately depend on allocations, or the lack thereof, to core investments because investment risk and return are largely derived from three factors:

- Market risk and return;
- A portfolio's level of exposure to the market—in other words, its asset allocation; and
- A portfolio's effectiveness at capturing market risk and return; i.e., its construction and implementation.

[1] Daniel W. Wallick, Neeraj Bhatia, and C. William Cole. "Building a global core-satellite portfolio," Vanguard research, October 2010.

Factor one falls outside of our sphere of control, but advisors and investors directly manage factors two and three. The role of a core allocation is to connect a portfolio directly to the market, and it can be thought of as the main return-generation engine. If alpha-generating satellites are added but the core has not been properly built, it's somewhat like attaching a flagpole or weathervane to a partially constructed house. You can hang a flag or see the wind direction, but you will not have adequate shelter.

In other words, your basic need and central purpose have not been met.

In spite of their comparative simplicity, core investments and their relative portfolio weightings ought to be thought through completely. A few principles bear emphasis when making such deliberations, especially those having to do with underlying benchmarks, which ultimately drive risk and returns. Some key benchmark characteristics are:

- Consider including mid- and small-cap stocks
- Be composed of mutually exclusive building blocks
- Be investable
- Have broad, but efficient, market representation

If returns on the passively managed segment of the market equal the market return, then the return on the actively managed segment must also mirror the market.

CONSIDER INCLUDING MID- AND SMALL-CAP STOCKS

Contrary to the mainstream view, indexing has worked just as well for mid-caps and small-caps as it has for large-cap stocks. As Professor William Sharpe has shown arithmetically,[2] the effectiveness of indexing is not a function of market efficiency. The market return is the weighted average of the returns on the passive and active market segments. If returns on the passively managed segment of the market equal the market return, then the return on the actively managed segment must also mirror the market. Therefore, the average passive manager will generate the same returns as the average active manager, before expenses. However, active management is usually significantly more expensive than passive management, so the return on the actively managed dollar must be less than that of the average passively managed dollar. Segmenting by market cap does not negate these principles. In addition, while the average passive manager will generate the same returns (before expenses) as the average active manager, the *range* of active returns is typically much wider, and skewed more to the downside than the range of passive returns.

Our S&P Index Versus Active (SPIVA®) Scorecard reports on historical returns of active mutual fund managers versus appropriate benchmarks and empirically demonstrates the case for indexing across market capitalizations.

[2] William F. Sharpe, "The Arithmetic of Active Management," Financial Analysts Journal, January/February 1991.

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Exhibit 1: Percentage of U.S. Equity Funds Outperformed by Benchmarks

FUND CATEGORY	BENCHMARK INDEX	ONE YEAR (%)	THREE YEARS (%)	FIVE YEARS (%)
All Multi-Cap Funds	S&P Composite 1500	68.15	83.79	79.16
All Large-Cap Funds	S&P 500®	63.25	86.49	75.37
All Mid-Cap Funds	S&P MidCap 400®	80.45	90.22	90.03
All Small-Cap Funds	S&P SmallCap 600®	66.50	83.05	82.76

Source: S&P Dow Jones Indices LLC Year-End 2012 SPIVA U.S. Scorecard. Data as of year-end 2012. Tables are provided for illustrative purposes.

As powerful as the SPIVA evidence is, it is even more convincing when you consider that very few of those funds that manage to outperform appropriate benchmarks in one period can do so consistently. The Persistence Scorecard, SPIVA's sister publication, tracks the consistency of top performers over consecutive annual periods and provides objective evidence showing how unlikely it is to select active managers who are able to consistently outperform benchmarks.

Exhibit 2: U.S. Equity Funds Remaining in the Top Quartile Over Five Years

FUND CATEGORY	TOP QUARTILE FUND COUNT AT END OF FIRST YEAR	PERCENTAGE (%) REMAINING IN TOP QUARTILE			
	SEPTEMBER 2008	SEPTEMBER 2009	SEPTEMBER 2010	SEPTEMBER 2011	SEPTEMBER 2012
All Multi-Cap Funds	154	23.38	4.55	1.95	0.65
All Large-Cap Funds	175	18.29	8.00	1.71	0.00
All Mid-Cap Funds	94	25.53	5.32	0.00	0.00
All Small-Cap Funds	127	21.26	3.15	0.00	0.00

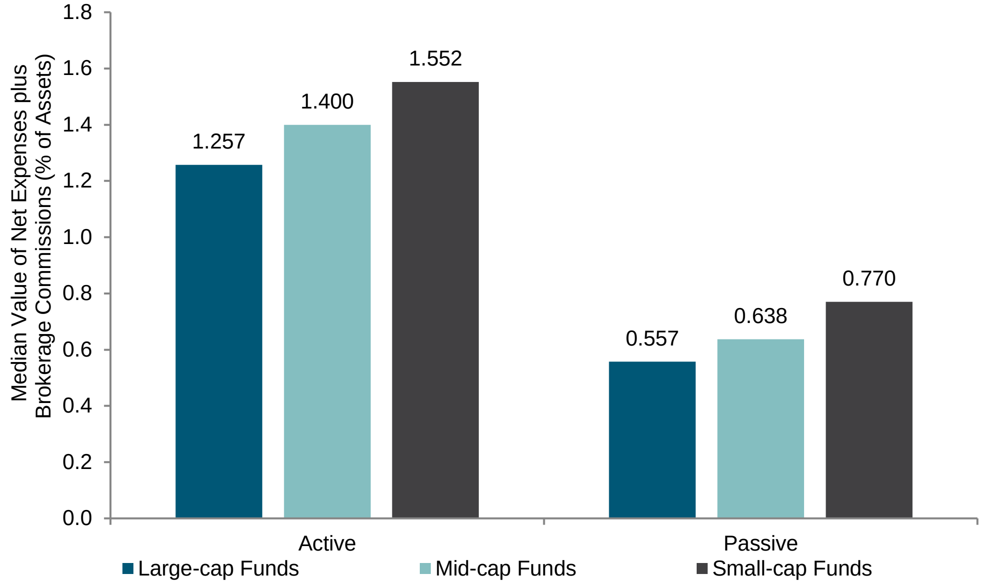
Source: S&P Dow Jones Indices LLC Year-End 2012 Persistence Scorecard. Data as of year-end 2012. Table is provided for illustrative purposes.

The SPIVA and Persistence Scorecards clearly show that Professor Sharpe's hypothesis is quite true—indexing works extremely well across all market caps.

The source of active managers' disadvantage, in the aggregate, is higher fees. Many active managers simply charge more for beta delivery than index funds. In fact, when compared to the actual active value delivered over and above market returns, active management fees are often seen as excessive and, in some cases, as unjustified.[3] Exhibit 3 breaks out a comprehensive measure of total costs, including net expenses and brokerage commissions, for active funds and index funds. It does not include indirect costs such as bid-ask spreads and market impact. Appendix 1 shows the full data set and sample sizes.

[3] Charles D. Ellis, "Murder on the Orient Express: The Mystery of Underperformance," Financial Analysts Journal, July/August 2012.

Exhibit 3: Median Value of Prospectus Net Expense Ratio Plus Brokerage Commissions



Source: S&P Dow Jones Indices LLC calculations using data from Morningstar Direct. Data as of June 2013. Funds for each size segment were screened in the Morningstar database by Morningstar Category. Categories include blend, growth, and value. Chart is provided for illustrative purposes only.

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MUTUALLY EXCLUSIVE BUILDING BLOCK CONSTRUCTION

S&P DJI's core U.S. index lineup comprises the mutually exclusive S&P 500, S&P MidCap 400 and S&P SmallCap 600, which together form the S&P Composite 1500. Large-, mid-, and small-cap stocks are included in this broad measure of the U.S. market. Micro-cap stocks are not included. In other words, the S&P Composite 1500 covers large-, mid- and small-cap stocks and the popular size segments do not overlap with each other. By contrast, the Russell 1000 index includes *both* large- and mid-cap stocks, while the Russell 2000 index delves into small- *and* micro-cap stocks. We discuss the questionable logic of including micro-cap stocks in core benchmarks below.

Exhibit 4: S&P Core U.S. Equity Indices

SIZE SEGMENTS	BROAD INDEX	SUB-ASSET CLASS INDICES	FLOAT-ADJUSTED WEIGHT IN S&P COMPOSITE 1500 (%)
Large, Mid, Small Stocks	S&P Composite 1500	-	-
Large Stocks	-	S&P 500	88.2
Mid-Cap Stocks	-	S&P MidCap 400	8.2
Small-Cap Stocks	-	S&P SmallCap 600	3.6

Source: S&P Dow Jones Indices LLC. Float-adjusted weights as of May 31, 2013. Table is provided for illustrative purposes.

Core U.S. equity investment exposure can be implemented using broad indices or with sub-asset class building blocks.

BE INVESTABLE

Investability has to do with the liquidity and market depth of index constituents. Some indications include trading volume, value traded, float-adjusted market cap and other measures. Larger, more liquid and tradable equity issues are said to be more investable than small, thinly traded issues. Therefore index design is an important aspect of core portfolio construction. Indices that contain many relatively illiquid stocks are more difficult to track than those which contain more liquid, investable stocks. Investable index constituents lead to more replicable indices.

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Exhibit 5 shows a few key metrics of investability for the S&P 1500, the Russell 3000 and the difference in comparison between the two indices.

Exhibit 5: Various Measures of Index Constituents' Investability

MEASURE	MEAN			MEDIAN		
	S&P COMPOSITE 1500	RUSSELL 3000	IN RUSSELL 3000 BUT NOT S&P COMPOSITE 1500	S&P COMPOSITE 1500	RUSSELL 3000	IN RUSSELL 3000 BUT NOT S&P COMPOSITE 1500
Market Capitalization (USD billions)	12.02	6.79	1.56	2.84	1.29	0.53
Float-Adjusted Market Cap (USD billions)	11.27	6.20	1.13	2.58	1.03	0.37
Daily Volume (1-Year Average, millions)	2.08	1.42	0.78	0.66	0.39	0.22
Daily Value Traded (1-Year Average, USD millions)	78.95	45.92	12.74	21.95	7.97	2.47

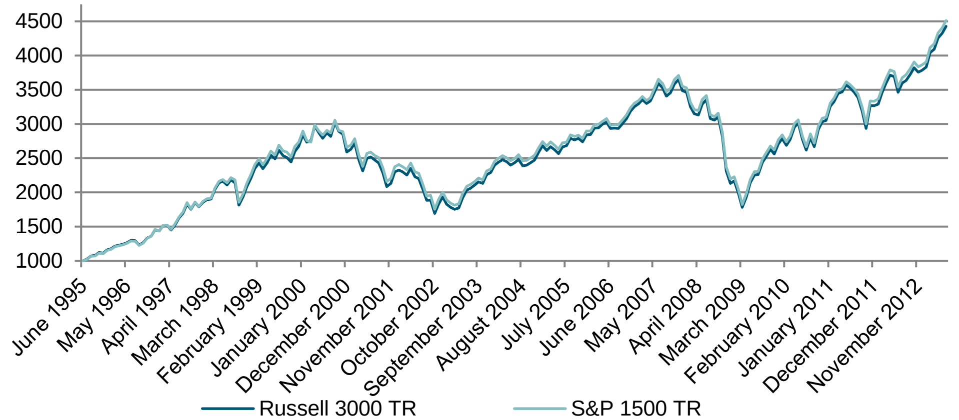
Source: S&P Dow Jones Indices LLC and S&P Capital IQ. Calculations using data from S&P Capital IQ as of July 15, 2013. Table is provided for illustrative purposes.

HAVE BROAD, BUT EFFICIENT, MARKET REPRESENTATION

Index providers must strike a balance between investability and market representation. A key element of index design is determination of rules and policies that govern which securities are to be included in a particular benchmark. Generally speaking, the further down the market-cap range one goes, the less investable are stocks. There is a trade-off between including more securities (creating higher market representation) and diminishing index constituent investability. Micro-cap stocks do not impact returns very greatly in a cap-weighted benchmark, and they certainly have a negative impact on investability, so the logic of including them in core indices is questionable.

Exhibits 6, 7a, and 7b show that the historical performance of the S&P Composite 1500 and the Russell 3000 is very similar, despite Russell's policy of including some stocks in the very small- and micro-cap segments.

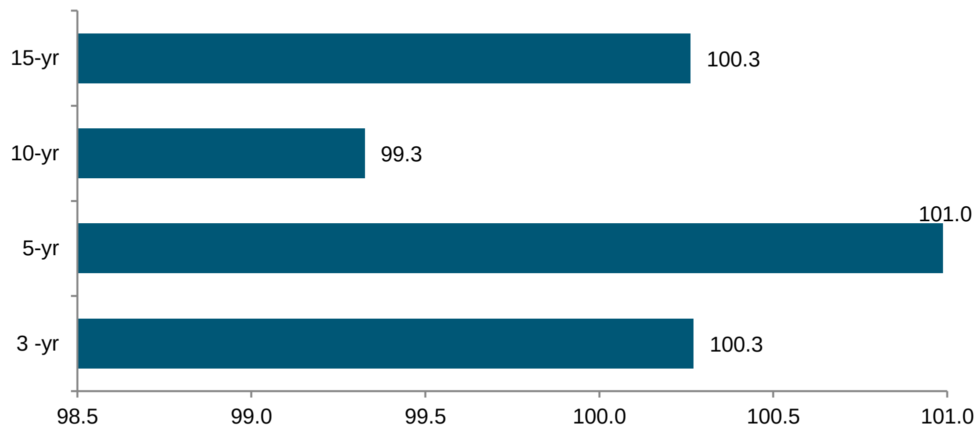
Exhibit 6: Historical Performance of the S&P Composite 1500 and Russell 3000 (Both Rebased at 1000)



Source: Russell Indexes, S&P Dow Jones Indices LLC. Index performance is based on monthly total returns from June 1995 through June 2013. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

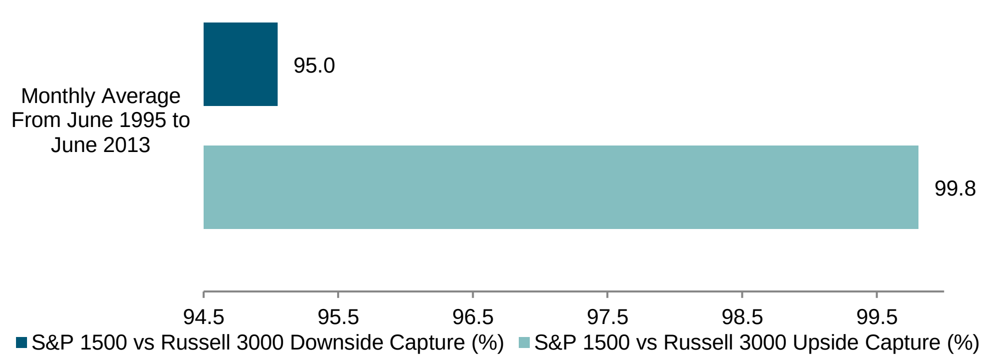
A key element of index design is determination of rules and policies that govern which securities are to be included in a particular benchmark.

Exhibit 7a: Upside Capture Ratios for the S&P Composite 1500 Versus the Russell 3000



Source: Russell Indexes, S&P Dow Jones Indices LLC. Upside capture is based on monthly total returns through June 2013. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Exhibit 7b: Monthly Average Upside and Downside Capture Ratios for the S&P Composite 1500 Versus the Russell 3000



Source: Russell Indexes, S&P Dow Jones Indices LLC. Upside, and downside, capture are based on monthly total returns from June 1995 through June 2013. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Historically, going too far down the cap-size range has not paid off in the context of core benchmark construction. As Exhibit 7b highlights, it may even introduce more downside risk without upside reward. While micro-cap stocks may play a role in portfolio construction, incorporating them into core cap-weighted benchmarks have not historically added value, though they have made index replication more complex.

SUMMARY

Historically, going too far down the cap-size range has not paid off in the context of core benchmark construction.

While core–satellite portfolio construction is intuitive and sensible, proper attention to core allocation construction is often lacking, for various reasons. Most importantly, advisors and investors should acquire knowledge of underlying benchmarks and use it to inform their allocations to core investments.

Core equity benchmarks should include mid- and small-cap stocks, offer the flexibility of mutually exclusive building blocks, have index constituents that are investable and offer broad, but efficient, market representation. Importantly, indexing works just as well for mid- and small-cap stocks as it does for large-cap stocks because the efficacy of indexing is not a function of market efficiency.

APPENDIX

The full data set, related to Exhibit 3, includes mutual funds and exchange traded funds (ETFs). However, brokerage commissions as a percentage of assets under management are not available for ETFs and some mutual funds. Therefore, sample sizes for brokerage commissions and total of expenses and commissions are lower than that for net expense ratio only.

Appendix

MEDIAN (% OF ASSETS UNDER MANAGEMENT)	LARGE-CAP FUNDS		MID-CAP FUNDS		SMALL-CAP FUNDS	
	ACTIVE	PASSIVE	ACTIVE	PASSIVE	ACTIVE	PASSIVE
Net Expense Ratio	1.170 (n=4506)	0.480 (n=437)	1.260 (n=1516)	0.500 (n=159)	1.360 (n=1764)	0.535 (n=156)
Brokerage Commission	0.066 (n=4205)	0.003 (n=290)	0.109 (n=1421)	0.005 (n=106)	0.145 (n=1699)	0.015 (n=106)
Total (NER, BC)	1.257 (n=4205)	0.557 (n=290)	1.400 (n=1421)	0.638 (n=106)	1.552 (n=1699)	0.770 (n=106)

Source: S&P Dow Jones Indices LLC. Table provided for illustrative purposes.

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