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August 12, 2016

Notes on Indices and Benchmarking

4th Congreso Asofiduciarias

S&P Dow Jones Indices

S&P Global

Index Highlights

Seasoned technology

- Often sponsored by journalists or stock exchanges

Shorthand for performance of “the market”

Can be used as

- Benchmark for an active portfolio
- Basis for a passive portfolio

Outline

S&P Dow Jones Indices

Why Indexing Grew

Why Index Growth Will Continue

S&P Dow Jones Indices

(Abbreviated) History of Indexing

Dow Jones Industrials

- 1896, 12 stocks, price-weighted
- Oldest index still in use

S&P's predecessor, Standard Statistics Company

- A 233 stock *capitalization-weighted* weekly index beginning in 1923
- A 90 stock daily index beginning in 1926

S&P 500® replaced 90 stock index in March 1957

Capitalization Weighting

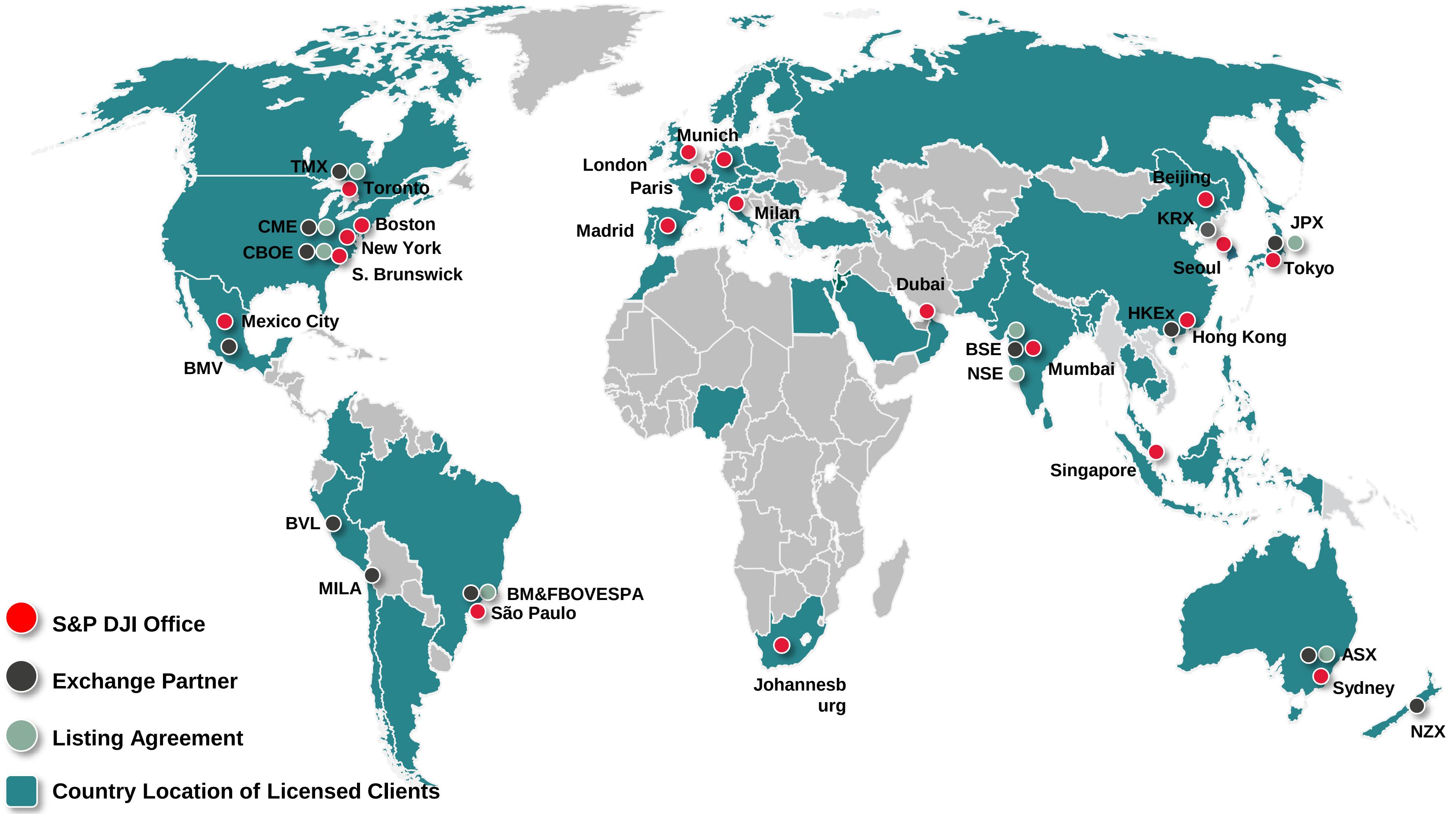
Capitalization-weighted indices tell us the performance of the average investor, weighted by the amount of capital invested

Can be held by everyone
- Does not require offsetting tilt from another investor
- No other portfolio has this characteristic

Cheap and easy to maintain
- Rebalancing required only when index changes

Global Reach. Local Expertise.

Clients in 71 Countries, 20 Offices Worldwide, and ~400 Client-Dedicated Professionals with Local Index Understanding



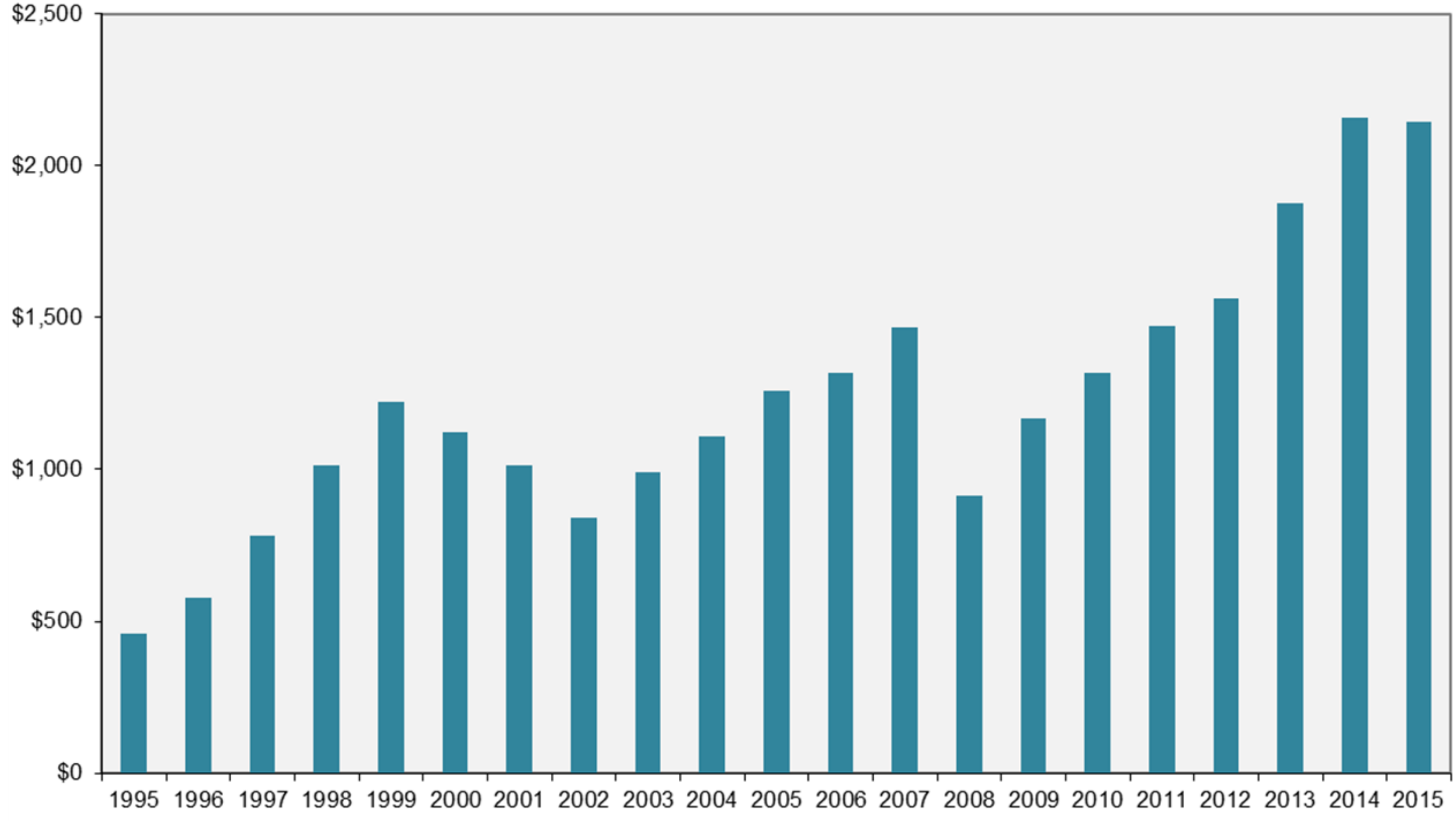
S&P Dow Jones Indices

S&P Global

S&P Dow Jones Indices Client Base

- Clients in **71** countries; 1,800 data licensees, and nearly 500 IP licensees
- Client relationships with **over 90** of the top **100** asset managers, as measured by assets, and more than **50** of the largest public pension funds
- Over **610** S&P Dow Jones Indices-linked ETFs listed around the globe, with over **USD 832 billion** in AUM
- More than **6,000** headline custom indices are calculated daily for over **150** clients in **45** countries

Assets Tracking the S&P 500



Source: S&P Dow Jones Indices.

Why Indexing Grew

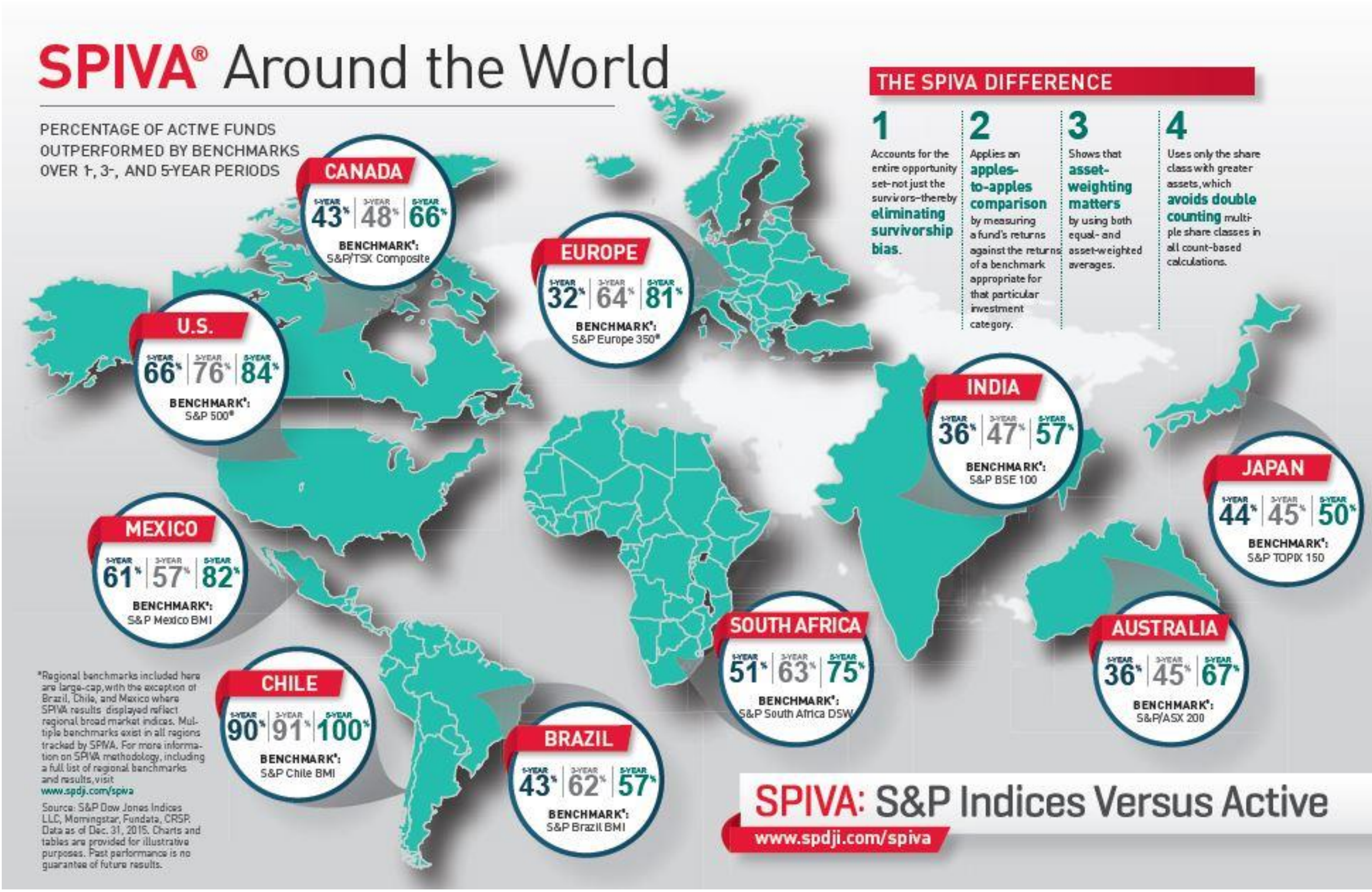
Index Versus Active Performance - US

Percentage of U.S. Equity Funds Underperforming Index

Fund Category	Comparison Index	1 Year	5 Years
All Large Cap Funds	S&P 500	66%	84%
All Mid Cap Funds	S&P MidCap 400	57%	77%
All Small Cap Funds	S&P SmallCap 600	72%	90%

Source: S&P Dow Jones Indices LLC, Center for Research in Security Prices (CRSP). Data as of December 31, 2015. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Index Versus Active Performance – Global



SPIVA in "Good" and "Bad" Years

Year	S&P 500 Up	% of Funds Underperformed
2003	28.7%	65
2004	10.9%	62
2005	4.9%	45
2006	15.8%	69
2007	5.5%	45
2009	26.5%	51
2010	15.1%	62
2012	16.0%	63
2013	32.4%	56
2014	13.7%	86
Average	**16.9%**	**60**

Year	S&P 500 Down/Flat	% of Funds Underperformed
2000	-9.1%	37
2001	-11.9%	58
2002	-22.1%	61
2008	-37.0%	54
2011	2.1%	81
2015	1.4%	66
Average	**-12.8%**	**60**

Source: S&P Dow Jones Indices LLC, Center for Research in Security Prices (CRSP). Data as of December 31, 2015. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

Persistence of Active Performance

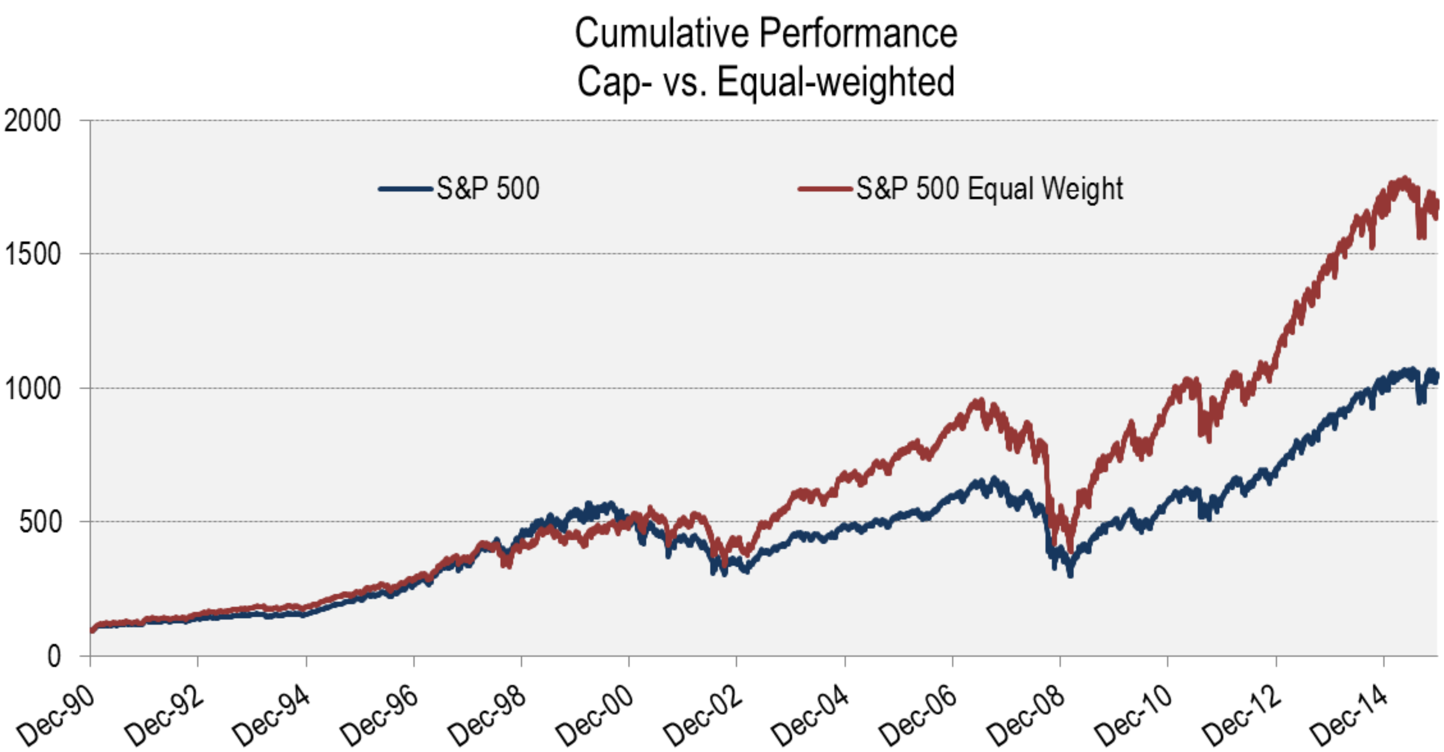
Percentage of U.S. Equity Funds in Top Half of Distribution

Fund Category	% in Top Half 5 Consecutive Years
Large Cap Funds	4.82%
Mid Cap Funds	3.45%
Small Cap Funds	7.77%

N.B. Probability of flipping heads four times in a row = 6.25%

Source: S&P Dow Jones Indices. Data as of September 30, 2015. Tables are provided for illustrative purposes. Past performance is not a guarantee of future results.

Long-Term Comparative Index Performance (S&P 500 Equal Weight)



Source: S&P Dow Jones Indices. Data from December 31, 1990 through December 31, 2015. Graphs are provided for illustrative purposes only. Past performance is not a guarantee of future results. This graph reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with backtested performance.

Why Index Growth Will Continue

No Natural Source of Alpha

Investor A can be above average only if Investor B is below average.

The total outperformance of the winners must equal the total underperformance of the losers (before costs).

The source of the winners' positive alpha is the losers' negative alpha.

If more investors opt for passive management:

- There will be fewer potential losers
- There will be fewer gains for potential winners.

How Might the Supply of Alpha Shrink?

	A	B
Total Market Cap	$20.0 T	$20.0 T
% actively managed	100%	90%
Value Actively Managed	$20.0 T	$18.0 T
Value Outperforming	$10.0 T	$9.0 T
Value Underperforming	$10.0 T	$9.0 T
Average Underperformance (%)	5%	4%
Total Underperformance ($)	$500 B	$360 B

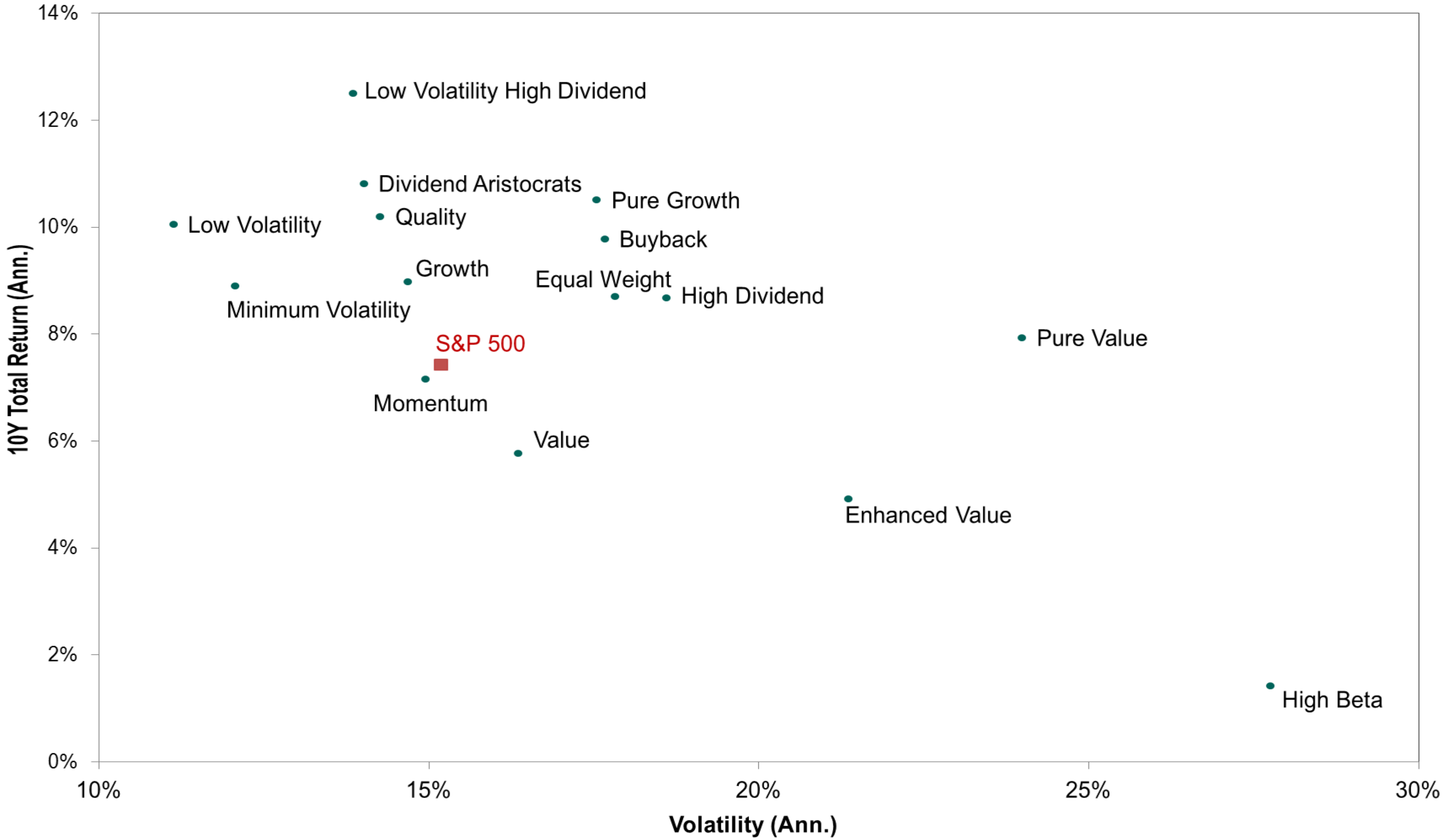
A hypothetical 10% reduction in active AUM led to a hypothetical 28% reduction in outperformance.

Source: S&P Dow Jones Indices. Chart is for illustrative purposes only.

Index Evolution

Indices	Examples	Attributes
Broad Market	S&P 500®, S&P Global BMI	• Capitalization-weighted • Aim to represent an asset class
Specialized	S&P MidCap 400®, S&P Select Sector indices	• Focus on a subset of the broader market • Most frequently defined in terms of size, sector, or industry • Typically capitalization-weighted
Factor/ Smart Beta/ Strategic Beta	S&P 500 Low Volatility, S&P 500 High Beta	• Focus on specific *patterns* or *characteristics* • Better "indicize" active strategies • Typically not capitalization-weighted

10-Year Risk & Return - Absolute



Source: S&P Dow Jones Indices LLC and/or its affiliates. Data as of June 30, 2016.

Factor Indices

Provide exposure to factors or combinations of factors

By “indicizing” factor tilts

- Provide cheap, transparent, reliable factor exposure
- Require active managers to add value by stock selection
- Make active management harder

Summary

Most active managers fail most of the time.

- Index investors have an above-average chance of above-average results.
- Active managers should be benchmarked against appropriate passive standards.

Active management is likely to become even more challenging in the future.

- The growth of cap-weighted indices makes it harder for the active managers who remain.
- The growth of factor indices presents an additional challenge.

Performance Disclosure

The S&P 500 Equal Weight Index was launched on January 8, 2003.
The S&P 500 Low Volatility Index and the S&P 500 High Beta Index were launched on April 4, 2011.
The S&P 500 Low Volatility High Dividend Index was launched September 17, 2012.
The S&P 500 Minimum Volatility Index was launched November 9, 2012.
The S&P 500 Buyback Index was launched November 29, 2012.
The S&P 500 Quality Index was launched on July 8, 2014.
The S&P 500 Momentum Index was launched on November 18, 2014.
The S&P 500 Enhanced Value Index was launched April 27, 2015.
The S&P 500 High Dividend Index was launched September 21, 2015.

All information presented prior to the launch date is back-tested. Back-tested performance is not actual performance, but is hypothetical. The back-test calculations are based on the same methodology that was in effect when the index was officially launched. Complete index methodology details are available at www.spdji.com. It is not possible to invest directly in an index.

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency on their products. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the Index is set at a fixed value for calculation purposes. The Launch Date designates the date upon which the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P Dow Jones Indices defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its datafeed to external parties. For Dow Jones-branded indicates introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

Past performance of the Index is not an indication of future results. Prospective application of the methodology used to construct the Index may not result in performance commensurate with the back-test returns shown. The back-test period does not necessarily correspond to the entire available history of the Index. Please refer to the methodology paper for the Index, available at www.spdji.com for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Another limitation of using back-tested information is that the back-tested calculation is generally prepared with the benefit of hindsight. Back-tested information reflects the application of the index methodology and selection of index constituents in hindsight. No hypothetical record can completely account for the impact of financial risk in actual trading. For example, there are numerous factors related to the equities, fixed income, or commodities markets in general which cannot be, and have not been accounted for in the preparation of the index information set forth, all of which can affect actual performance.

The Index returns shown do not represent the results of actual trading of investable assets/securities. S&P Dow Jones Indices LLC maintains the Index and calculates the Index levels and performance shown or discussed, but does not manage actual assets. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the Index or investment funds that are intended to track the performance of the Index. The imposition of these fees and charges would cause actual and back-tested performance of the securities/fund to be lower than the Index performance shown. As a simple example, if an index returned 10% on a US $100,000 investment for a 12-month period (or US $10,000) and an actual asset-based fee of 1.5% was imposed at the end of the period on the investment plus accrued interest (or US $1,650), the net return would be 8.35% (or US $8,350) for the year. Over a three year period, an annual 1.5% fee taken at year end with an assumed 10% return per year would result in a cumulative gross return of 33.10%, a total fee of US $5,375, and a cumulative net return of 27.2% (or US $27,200).

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