

The Growth of Indexing

What is happening, and why?

Craig J. Lazzara, CFA

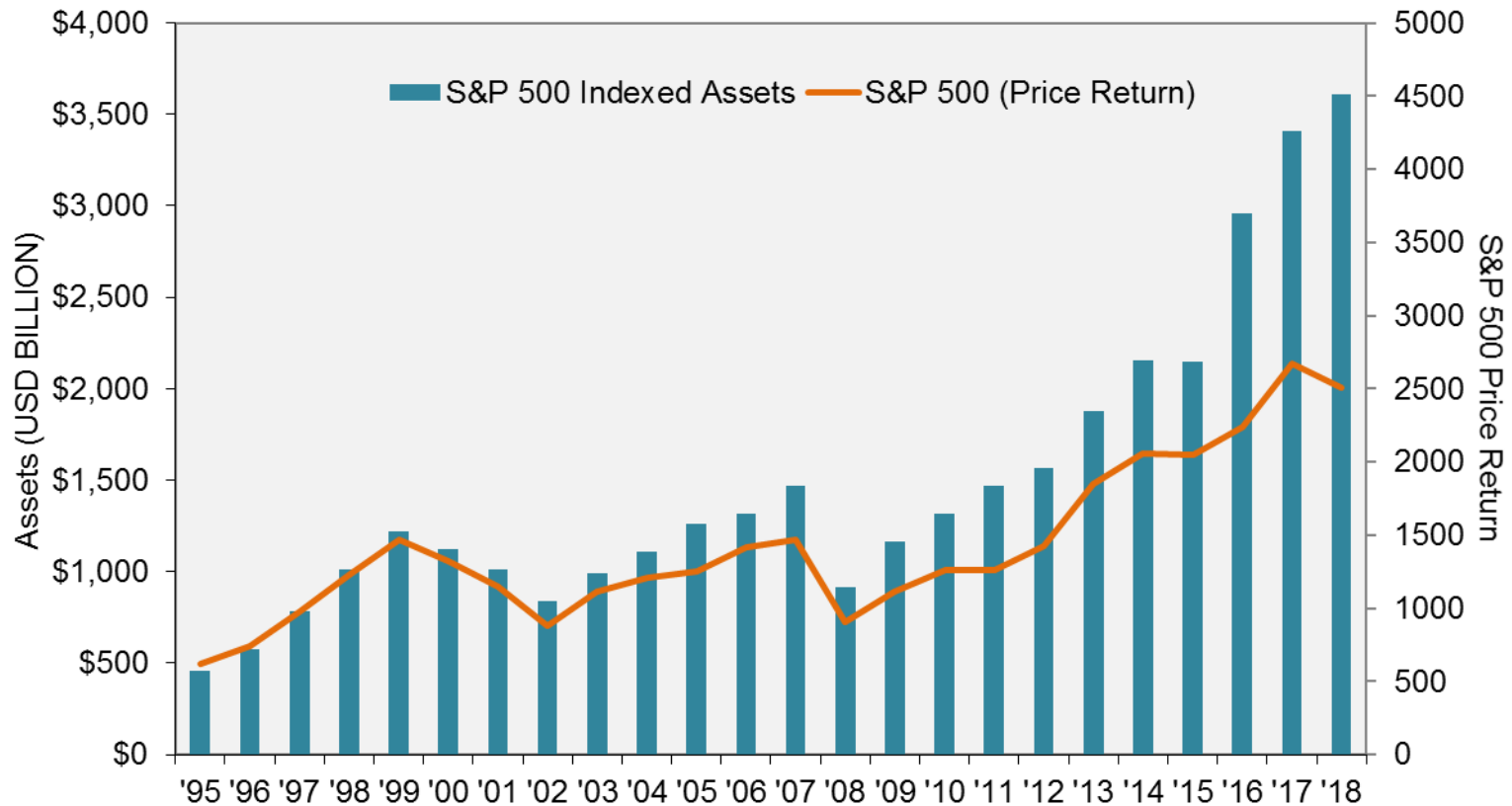
19 February 2020

**S&P Dow Jones
Indices**

A Division of **S&P Global**

Assets Tracking the S&P 500

Approximately USD 3.6 Trillion Track the S&P 500



Source: S&P Dow Jones Indices. Data as of Dec. 31, 2018. Charts are provided for illustrative purposes. Past performance is no guarantee of future results.

**S&P Dow Jones
Indices**

A Division of S&P Global

The Growth of Indexing

- Evidence
- Explanations
- Evolution

Evidence

Some Early Observations

“Contrary to their oft articulated goal of outperforming the market averages, investment managers are not beating the market: The market is beating them.”

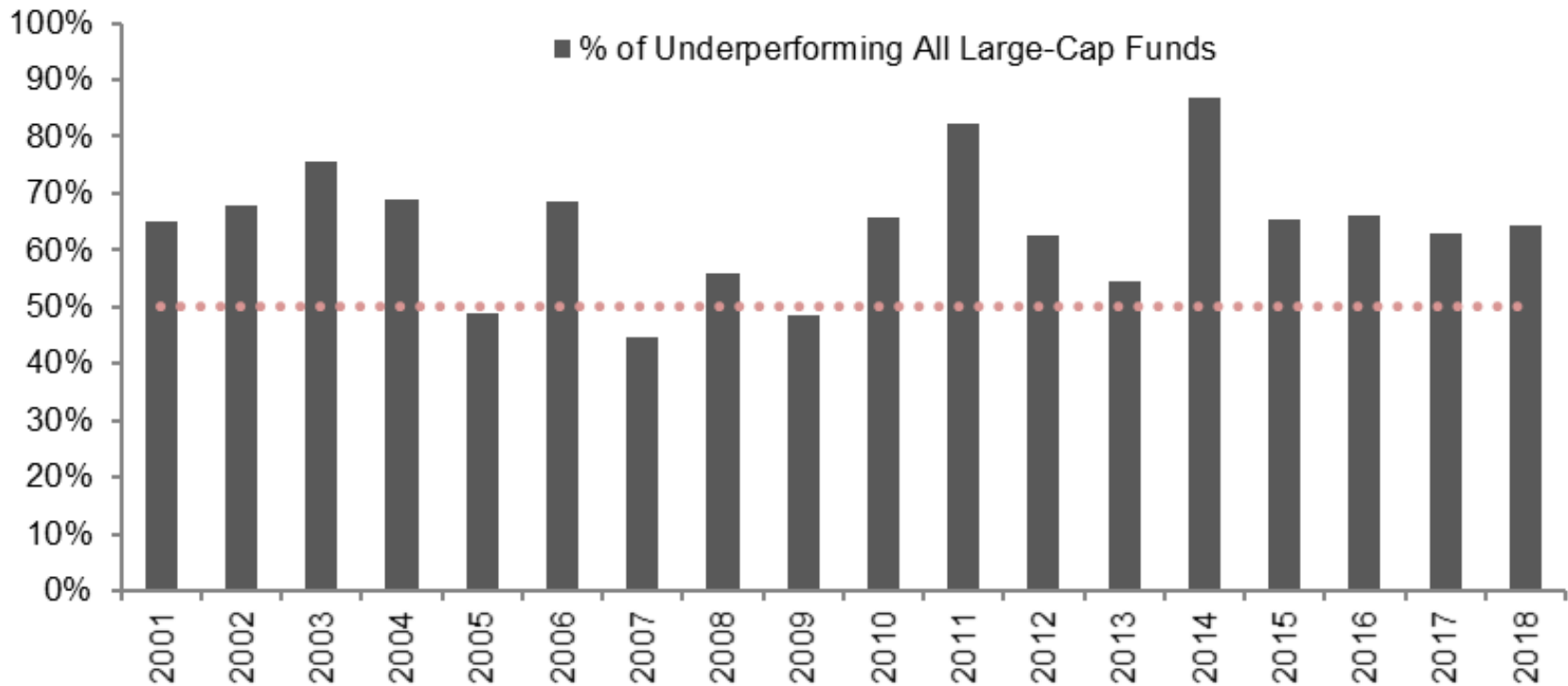
– Charles D. Ellis, “The Loser’s Game, *Financial Analysts Journal*, 1975

“A respect for evidence compels me to incline toward the hypothesis that most portfolio decision makers should go out of business – take up plumbing, teach Greek, or help produce the annual GNP by serving as corporate executives.”

– Paul A. Samuelson, “Challenge to judgment,” *Journal of Portfolio Management*, 1974

Variation in Active Managers' Success

Most Active Managers Underperform Most of the Time



Source: S&P Dow Jones Indices LLC, Center for Research in Security Prices (CRSP). Data from Dec. 31, 2000 through Dec. 31, 2018. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

**S&P Dow Jones
Indices**

A Division of S&P Global

Persistence of Above-Average Performance – U.S. Five Year Intervals

US Equity Funds in Two Consecutive Five-Year Periods

Fund Category	% Repeating in Top Half
Large Cap	44.7%
Mid Cap	33.3%
Small Cap	45.5%

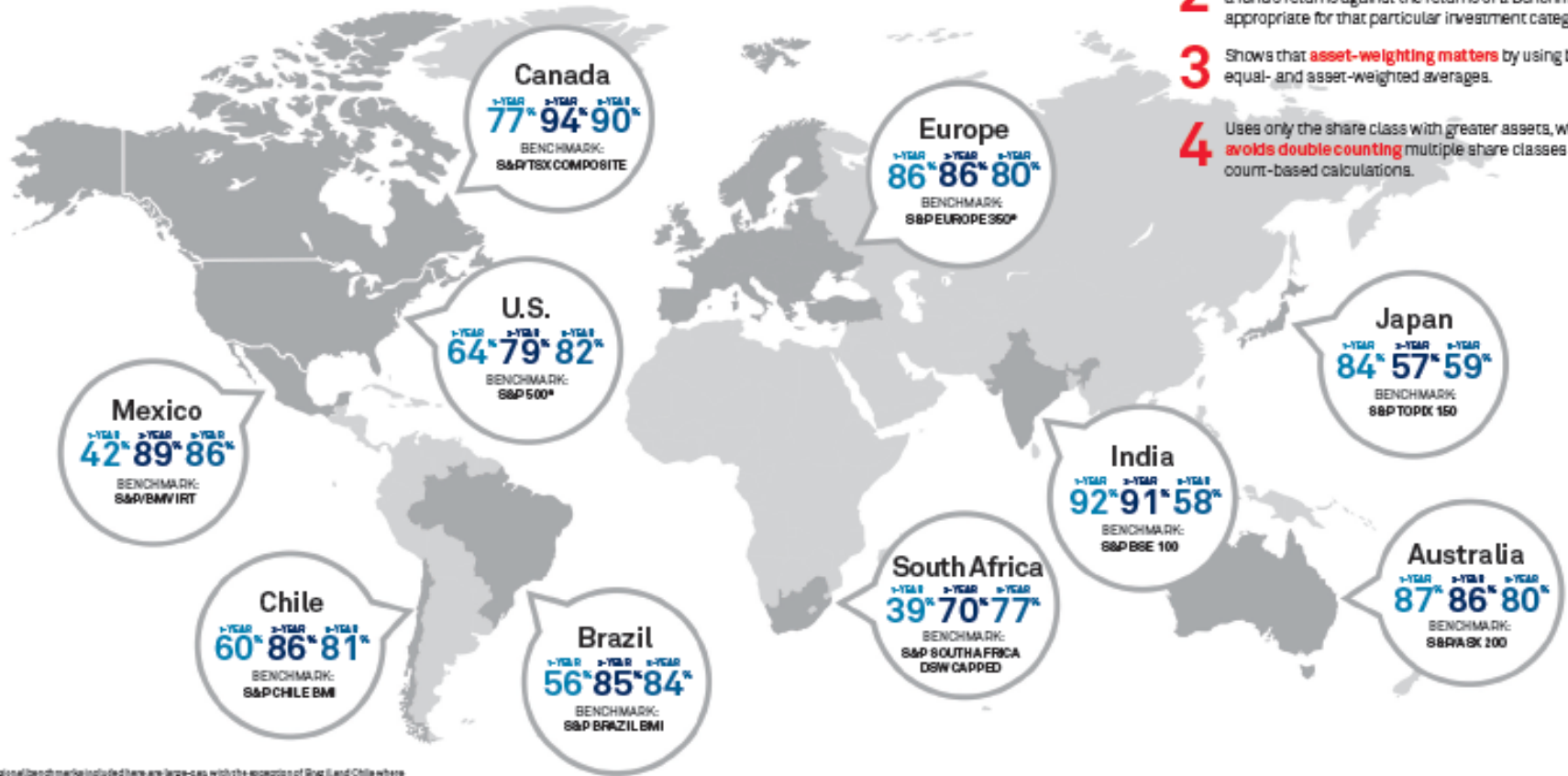
Source: S&P Dow Jones Indices LLC, CRSP. Data as of Sept. 30, 2019. Table is provided for illustrative purposes. Past performance is no guarantee of future results.

**S&P Dow Jones
Indices**

A Division of S&P Global

SPIVA® Around the World

Percentage of active funds outperformed by benchmarks* over 1-, 3-, and 5-year periods



The SPIVA Difference

- 1 Accounts for the entire opportunity set—not just the survivors—thereby **eliminating survivorship bias**.
- 2 Applies an **apples-to-apples comparison** by measuring a fund's returns against the returns of a benchmark appropriate for that particular investment category.
- 3 Shows that **asset-weighting matters** by using both equal- and asset-weighted averages.
- 4 Uses only the share class with greater assets, which **avoids double counting** multiple share classes in all court-based calculations.

* Regional benchmarks included here are large-cap, with the exception of Brazil and Chile where SPIVA results displayed reflect regionalized market indices. Multiple benchmark series in all regions included by SPIVA. For more information on SPIVA methodology, including a full list of regional benchmarks and results, visit www.spdji.com/spiva.

Source: S&P Dow Jones Indices LLC, Morningstar Fundata, CRDR Database of December 31, 2018. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

SPIVA: S&P Indices Versus Active

www.spdji.com/spiva

S&P Dow Jones Indices

A Division of S&P Global

Summarising the Evidence...

- Most active managers underperform most of the time.
- Past success does not predict future success.
- These conclusions apply globally.

Explanations

Why Is Active Management So Difficult?

- Professionalization
- Cost
- Return Skewness
- Varying Rewards to Skill

No Natural Source of Outperformance

- 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.
- Critical variable is whether professionals, rather than undiversified amateurs, dominate a market.
- When funds shift from active to passive, the least skillful active managers lose the most assets.

Cost

- Index funds own a pro-rata slice of the entire market.
- Therefore the aggregate index portfolio is identical to the *aggregate* active portfolio.
- Average U.S. equity mutual fund expense ratios (2018)
 - Active funds 0.76%
 - Index funds 0.08%
- “...after costs, the return on the average actively managed dollar will be less than the return on the average passively managed dollar” – William F. Sharpe, “The Arithmetic of Active Management,” *Financial Analysts Journal*, 1991

Source: Investment Company Institute 2019 Fact Book

**S&P Dow Jones
Indices**

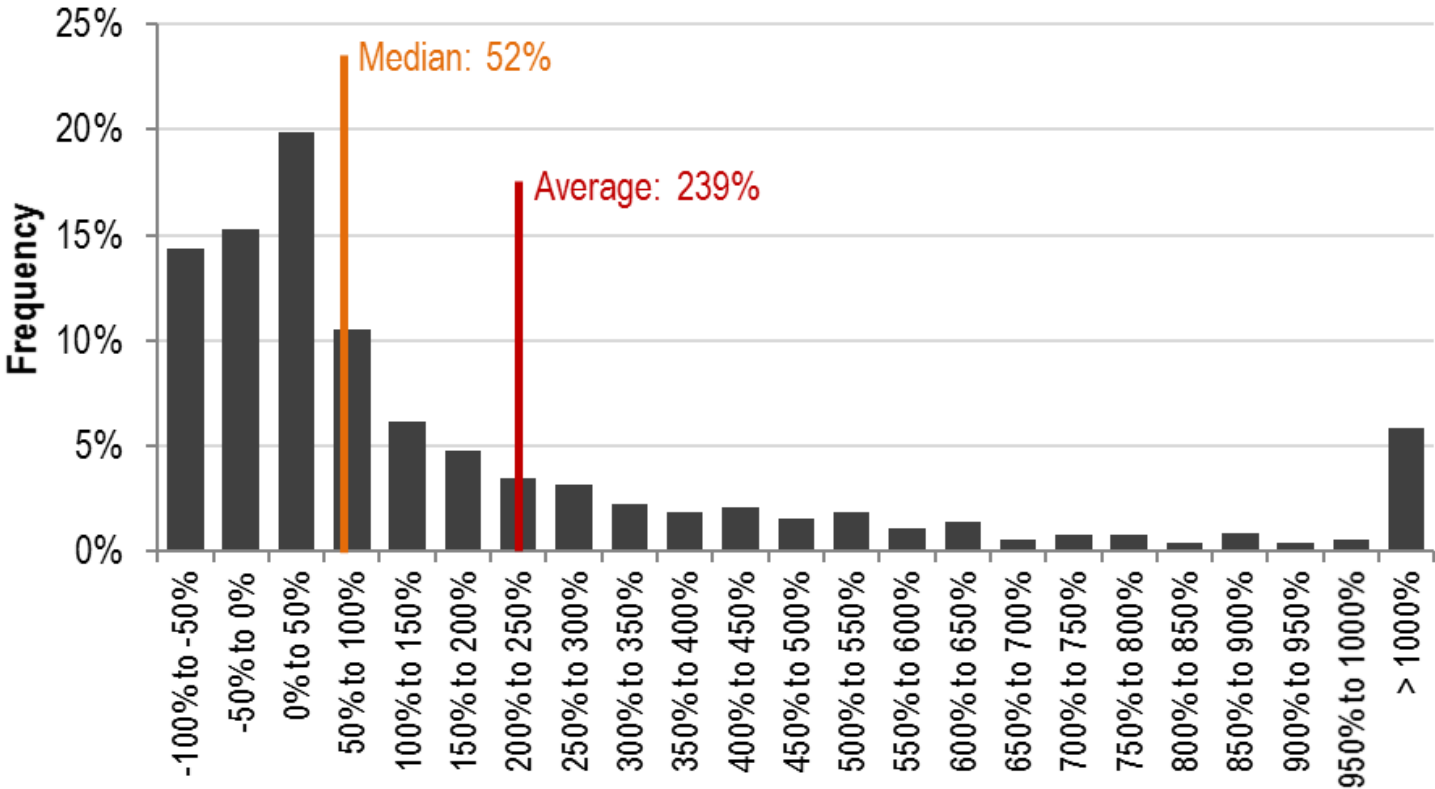
A Division of S&P Global

Skewness

- Stock returns are not normally distributed.
 - A stock can go down only 100%,
 - But can appreciate by much more than that.
- Simple definition of positive skewness: average return > median return
- How often does average return exceed median return?
 - For S&P 500 (1991-2019): 25 of 29 years
 - For S&P Europe 350 (2001-2019): 12 of 19 years

Source: S&P Dow Jones Indices. Past performance is no guarantee of future results.

Historical Skewness for S&P 500

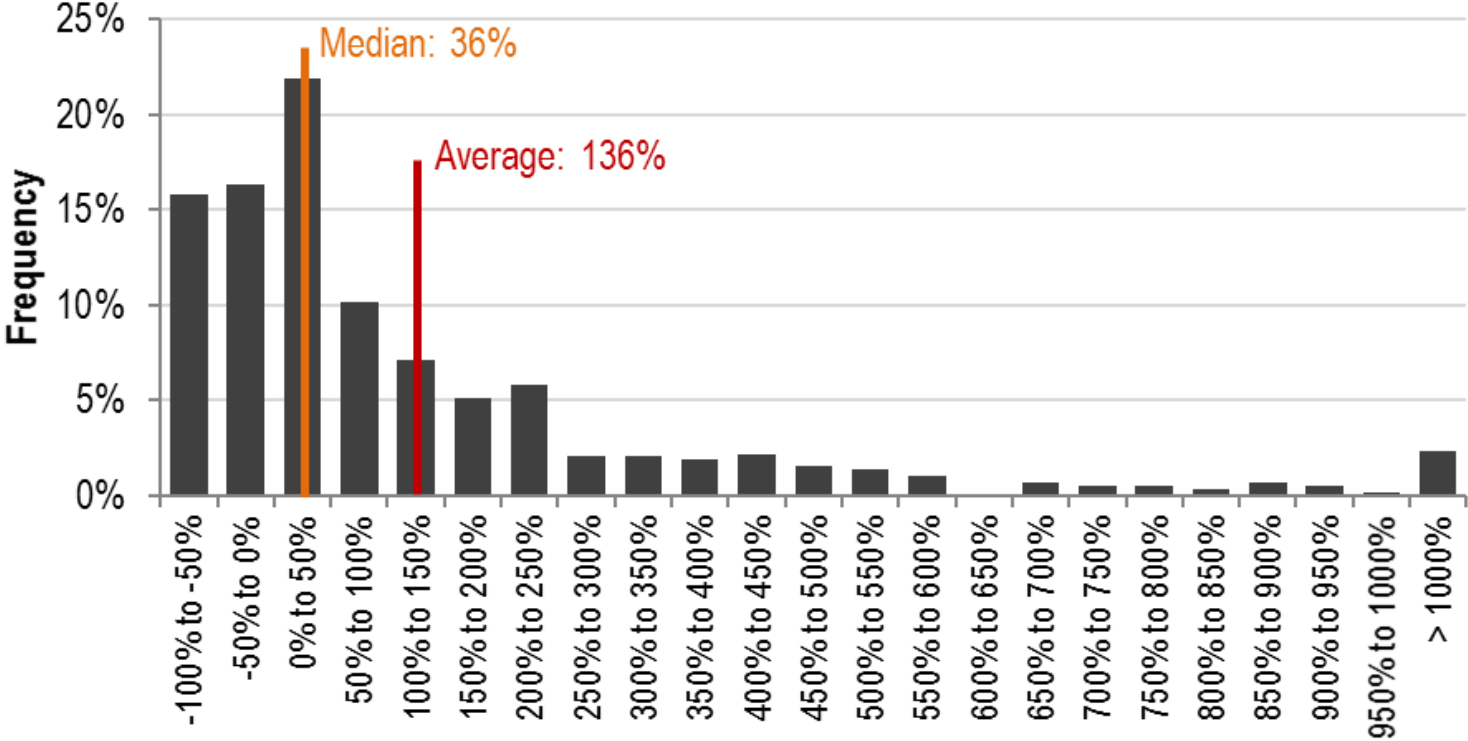


Source: S&P Dow Jones Indices LLC, FactSet. Data from Dec. 31, 1998 through Dec. 31, 2019. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

**S&P Dow Jones
Indices**

A Division of S&P Global

Historical Skewness for S&P Europe 350



Source: S&P Dow Jones Indices LLC, FactSet. Data from Dec. 31, 2000 through Dec. 31, 2019. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

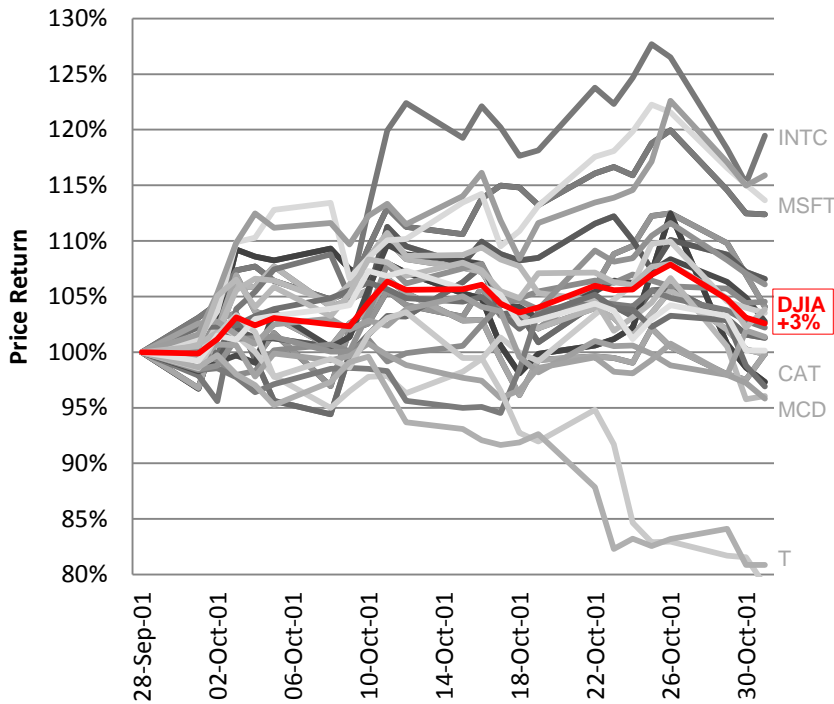
**S&P Dow Jones
Indices**

A Division of S&P Global

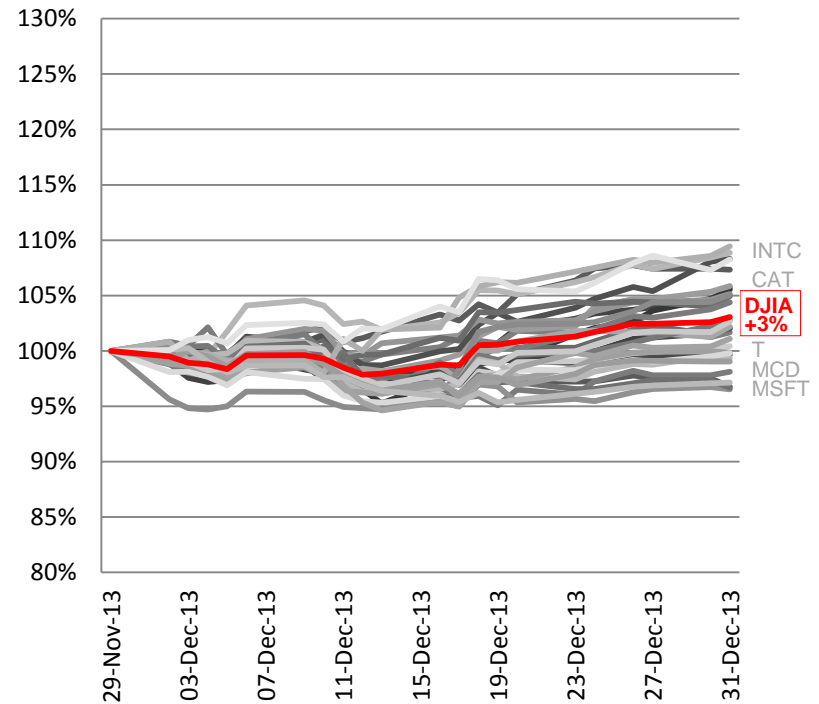
Pictures of Dispersion

Dispersion measures the spread of performances among components of an index.

**Dow Jones Industrial Average -
October 2001**



... and December 2013



— Dow Jones Industrial Average

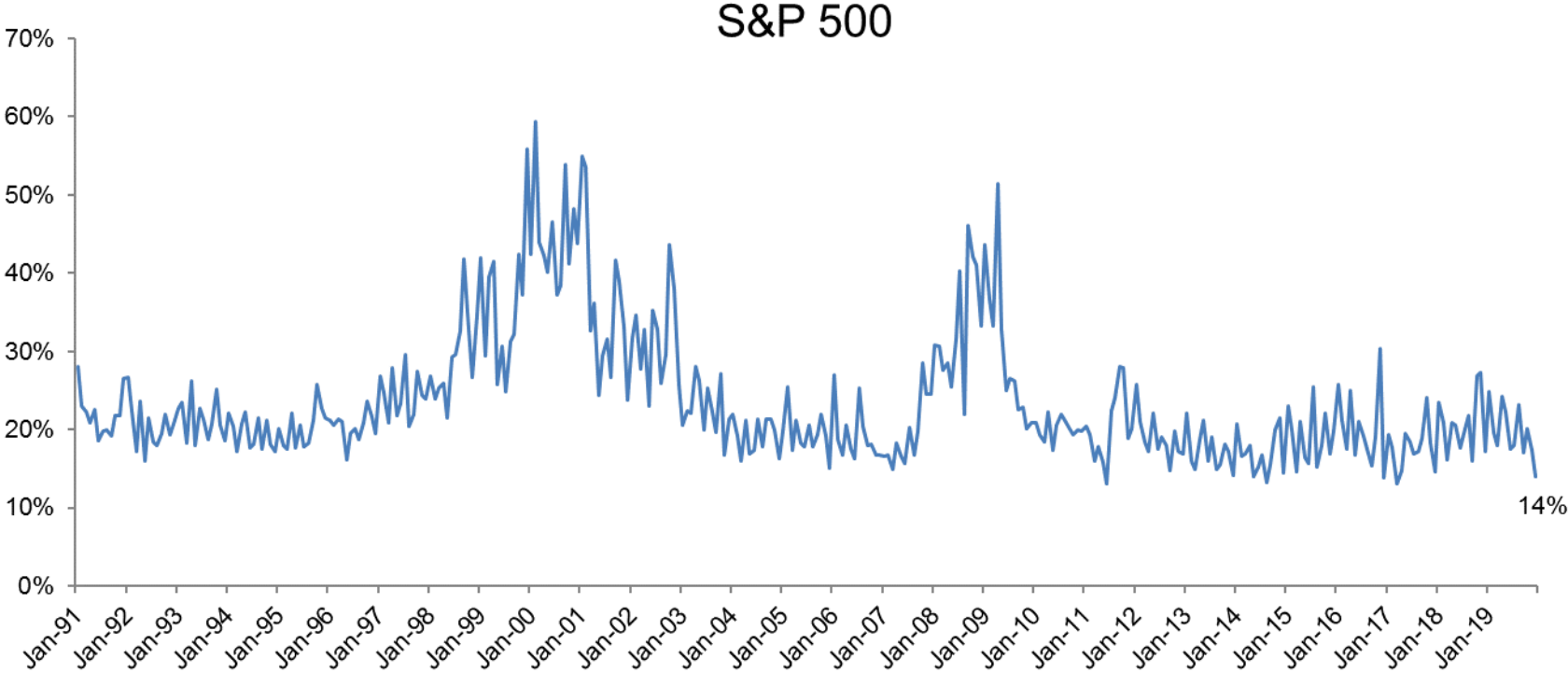
 DJIA Individual Components

Source: S&P Dow Jones Indices. Data as of Oct. 30, 2001 and Dec. 31, 2013. Past performance is no guarantee of future results.

**S&P Dow Jones
Indices**

A Division of S&P Global

Dispersion – U.S.

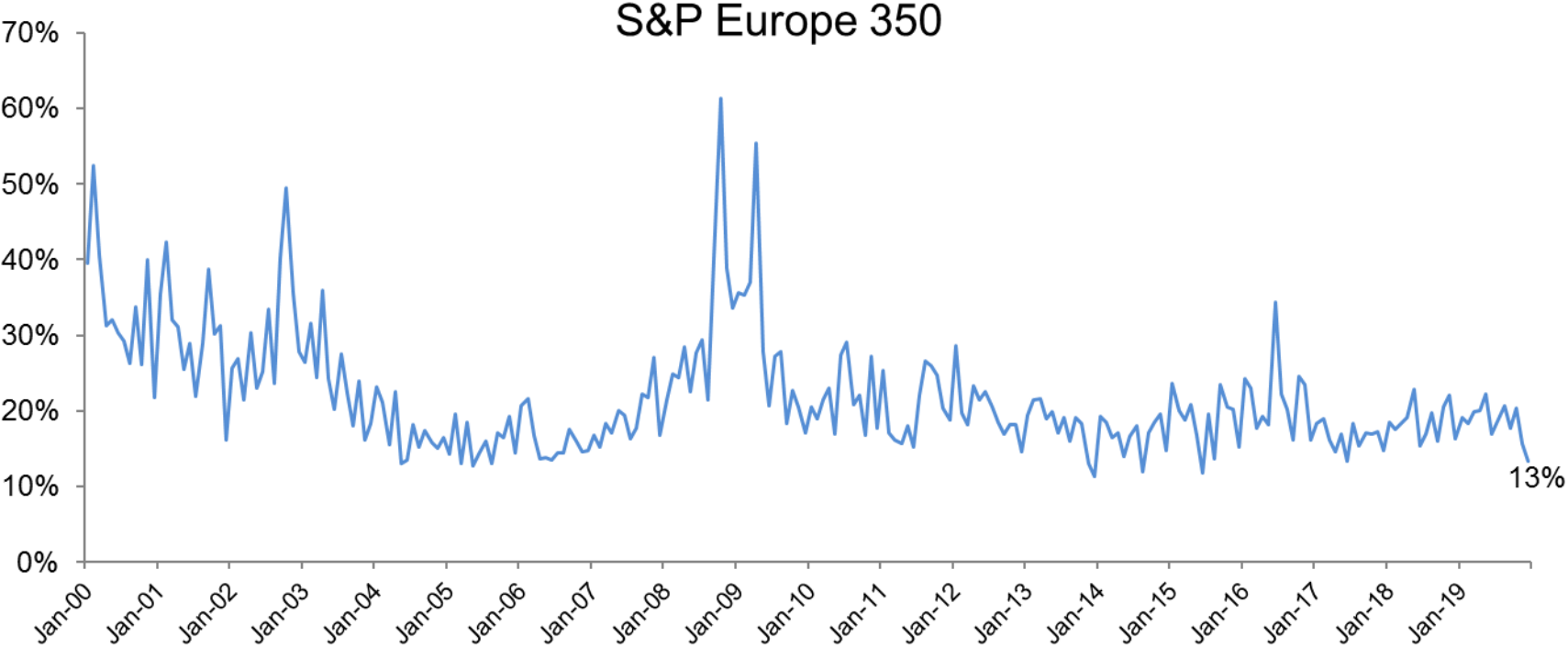


Source: S&P Dow Jones Indices. Data from Dec. 30, 1990 through Dec. 31, 2019. Chart is for illustrative purposes only. Past performance is not an indication of future results.

**S&P Dow Jones
Indices**

A Division of S&P Global

Dispersion – Europe



Source: S&P Dow Jones Indices. Data from Dec. 31, 1999 through Dec. 31, 2019. Chart is for illustrative purposes only. Past performance is not an indication of future results.

S&P Dow Jones Indices

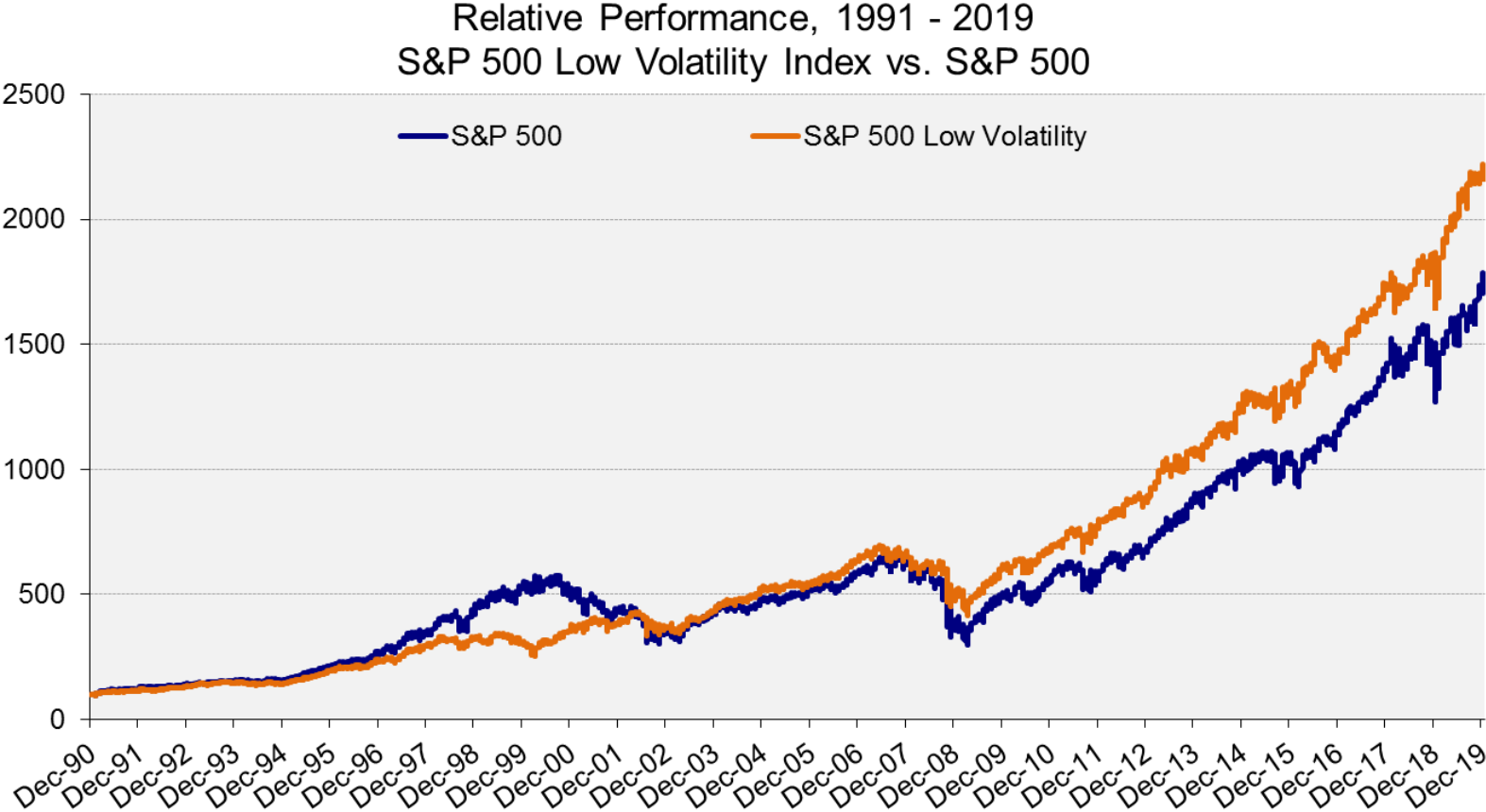
A Division of S&P Global

Evolution

Index Evolution

Indices	Examples	Attributes
Broad Market	S&P 500 [®] , S&P Europe 350	<ul style="list-style-type: none">• Capitalisation-weighted• Aim to represent an asset class
Specialised	S&P MidCap 400 [®] , S&P Select Sectors	<ul style="list-style-type: none">• Focus on a subset of the broader market• Typically capitalisation-weighted
Factor/ Smart Beta/ Strategic Beta	S&P 500 Low Volatility, S&P 500 Equal Weight	<ul style="list-style-type: none">• Focus on specific <i>patterns</i> or <i>characteristics</i>• Better “indicise” active strategies• Typically <i>not</i> capitalisation-weighted

S&P 500 Low Volatility Index

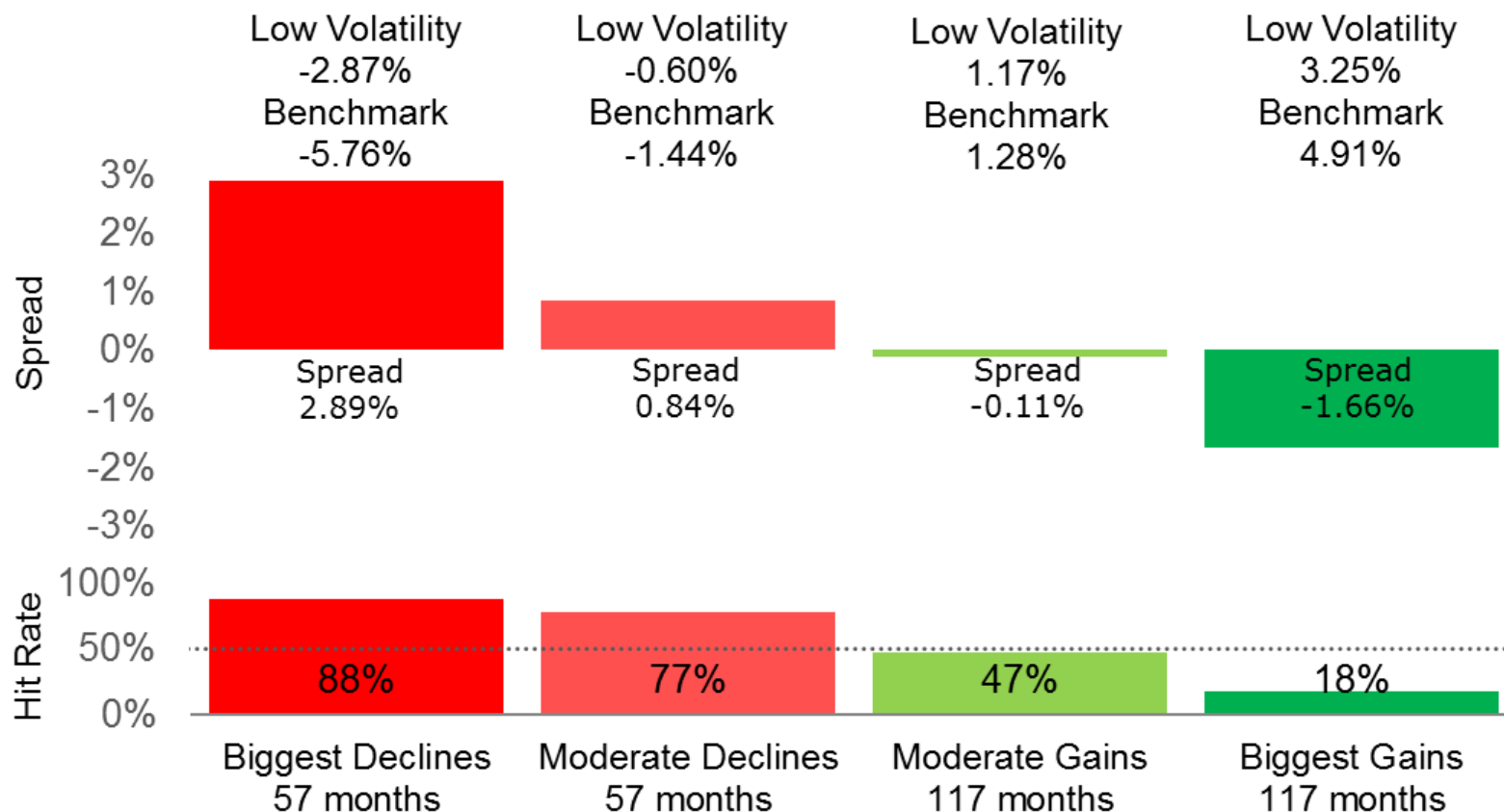


Source: S&P Dow Jones Indices. Data from Dec. 31, 1990 through Dec. 31, 2019. Charts are provided for illustrative purposes. Past performance is no guarantee of future results. This chart may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

S&P Dow Jones
Indices

A Division of S&P Global

Average Monthly Returns and Spreads



Source: S&P Dow Jones Indices. Data from Dec. 31, 1990 through Dec. 31, 2019. Biggest declines were months when the S&P 500 was down more than -2.46%, moderate declines were months when the S&P 500 returned between -2.46% and 0%, moderate gains were months when the S&P 500 returned between 0% and 2.50%, and biggest gains were months when the S&P 500 gained more than 2.50%. Charts are provided for illustrative purposes. Past performance is no guarantee of future results. This chart may reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

**S&P Dow Jones
Indices**

A Division of S&P Global

Final Thoughts

- Active managers face a severe and continuing performance challenge from index funds.
- The index advantage
 - Comes from a variety of sources
 - Is likely to persist
 - Does not depend on assumptions of market efficiency
- Factor indices exacerbate the index challenge.
 - Enable investors to indicise strategies formerly available only via active management

Thank you – Merci – Danke - Grazie

Fei Mei Chan

feimei.chan@spglobal.com

Tim Edwards, PhD

tim.edwards@spglobal.com

Anu R. Ganti, CFA

anu.ganti@spglobal.com

Craig J. Lazzara, CFA

craig.lazzara@spglobal.com

Performance Disclosure

The S&P 500 Equal Weight Index was launched January 8, 2003. The S&P 500 Enhanced Value Index was launched April 27, 2015. The S&P 500 Quality Index was launched July 8, 2014. The S&P 500 Momentum was launched November 18, 2014. The S&P 500 High Beta Index was launched April 4, 2011. The S&P 500 Equal Weight Index was launched January 8, 2003. The S&P 500 Low Volatility High Dividend Index was launched September 17, 2012. The S&P 500 Low Volatility Index was launched April 4, 2011. The back-test calculations are based on the same methodology that was in effect on the index Launch Date. Complete index methodology details are available at www.spdji.com.

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency. 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 indices 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).

General Disclaimer

Copyright © 2017 S&P Dow Jones Indices LLC, a division of S&P Global. All rights reserved. STANDARD & POOR'S, S&P, S&P 500, S&P 500 LOW VOLATILITY INDEX, S&P 100, S&P COMPOSITE 1500, S&P MIDCAP 400, S&P SMALLCAP 600, S&P GIVI, GLOBAL TITANS, DIVIDEND ARISTOCRATS, S&P TARGET DATE INDICES, GICS, SPIVA, SPDR and INDEXOLOGY are registered trademarks of Standard & Poor's Financial Services LLC, a division of S&P Global ("S&P"). DOW JONES, DJ, DJIA and DOW JONES INDUSTRIAL AVERAGE are registered trademarks of Dow Jones Trademark Holdings LLC ("Dow Jones"). These trademarks together with others have been licensed to S&P Dow Jones Indices LLC. Redistribution or reproduction in whole or in part are prohibited without written permission of S&P Dow Jones Indices LLC. This document does not constitute an offer of services in jurisdictions where S&P Dow Jones Indices LLC, S&P, Dow Jones or their respective affiliates (collectively "S&P Dow Jones Indices") do not have the necessary licenses. Except for certain custom index calculation services, all information provided by S&P Dow Jones Indices is impersonal and not tailored to the needs of any person, entity or group of persons. S&P Dow Jones Indices receives compensation in connection with licensing its indices to third parties and providing custom calculation services. Past performance of an index is not an indication or guarantee of future results.

It is not possible to invest directly in an index. Exposure to an asset class represented by an index may be available through investable instruments based on that index. S&P Dow Jones Indices does not sponsor, endorse, sell, promote or manage any investment fund or other investment vehicle that is offered by third parties and that seeks to provide an investment return based on the performance of any index. S&P Dow Jones Indices makes no assurance that investment products based on the index will accurately track index performance or provide positive investment returns. S&P Dow Jones Indices LLC is not an investment advisor, and S&P Dow Jones Indices makes no representation regarding the advisability of investing in any such investment fund or other investment vehicle. A decision to invest in any such investment fund or other investment vehicle should not be made in reliance on any of the statements set forth in this document. Prospective investors are advised to make an investment in any such fund or other vehicle only after carefully considering the risks associated with investing in such funds, as detailed in an offering memorandum or similar document that is prepared by or on behalf of the issuer of the investment fund or other investment product or vehicle. S&P Dow Jones Indices LLC is not a tax advisor. A tax advisor should be consulted to evaluate the impact of any tax-exempt securities on portfolios and the tax consequences of making any particular investment decision. Inclusion of a security within an index is not a recommendation by S&P Dow Jones Indices to buy, sell, or hold such security, nor is it considered to be investment advice. Closing prices for S&P Dow Jones Indices' US benchmark indices are calculated by S&P Dow Jones Indices based on the closing price of the individual constituents of the index as set by their primary exchange. Closing prices are received by S&P Dow Jones Indices from one of its third party vendors and verified by comparing them with prices from an alternative vendor. The vendors receive the closing price from the primary exchanges. Real-time intraday prices are calculated similarly without a second verification.

These materials have been prepared solely for informational purposes based upon information generally available to the public and from sources believed to be reliable. No content contained in these materials (including index data, ratings, credit-related analyses and data, research, valuations, model, software or other application or output therefrom) or any part thereof ("Content") may be modified, reverse-engineered, reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written permission of S&P Dow Jones Indices. The Content shall not be used for any unlawful or unauthorized purposes. S&P Dow Jones Indices and its third-party data providers and licensors (collectively "S&P Dow Jones Indices Parties") do not guarantee the accuracy, completeness, timeliness or availability of the Content. S&P Dow Jones Indices Parties are not responsible for any errors or omissions, regardless of the cause, for the results obtained from the use of the Content. THE CONTENT IS PROVIDED ON AN "AS IS" BASIS. S&P DOW JONES INDICES PARTIES DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall S&P Dow Jones Indices Parties be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs) in connection with any use of the Content even if advised of the possibility of such damages.

Any credit-related information and other related analyses and statements in the Content are statements of opinion as of the date they are expressed and not statements of fact. Any opinion, analyses and rating acknowledgement decisions are not recommendations to purchase, hold, or sell any securities or to make any investment decisions, and do not address the suitability of any security. S&P Dow Jones Indices does not assume any obligation to update the Content following publication in any form or format. The Content should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. S&P Dow Jones Indices LLC does not act as a fiduciary or an investment advisor. While S&P Dow Jones Indices has obtained information from sources they believe to be reliable, S&P Dow Jones Indices does not perform an audit or undertake any duty of due diligence or independent verification of any information it receives.

S&P Global keeps certain activities of its various divisions and business units separate from each other in order to preserve the independence and objectivity of their respective activities. As a result, certain divisions and business units of S&P Global may have information that is not available to other business units. S&P Global has established policies and procedures to maintain the confidentiality of certain non-public information received in connection with each analytical process.

In addition, S&P Dow Jones Indices provides a wide range of services to, or relating to, many organizations, including issuers of securities, investment advisers, broker-dealers, investment banks, other financial institutions and financial intermediaries, and accordingly may receive fees or other economic benefits from those organizations, including organizations whose securities or services they may recommend, rate, include in model portfolios, evaluate or otherwise address.