



The Index Liquidity Landscape

ACTIVE AND PASSIVE APPLICATIONS OF INDEX-LINKED PRODUCTS

Tim Edwards

Index Investment Strategy

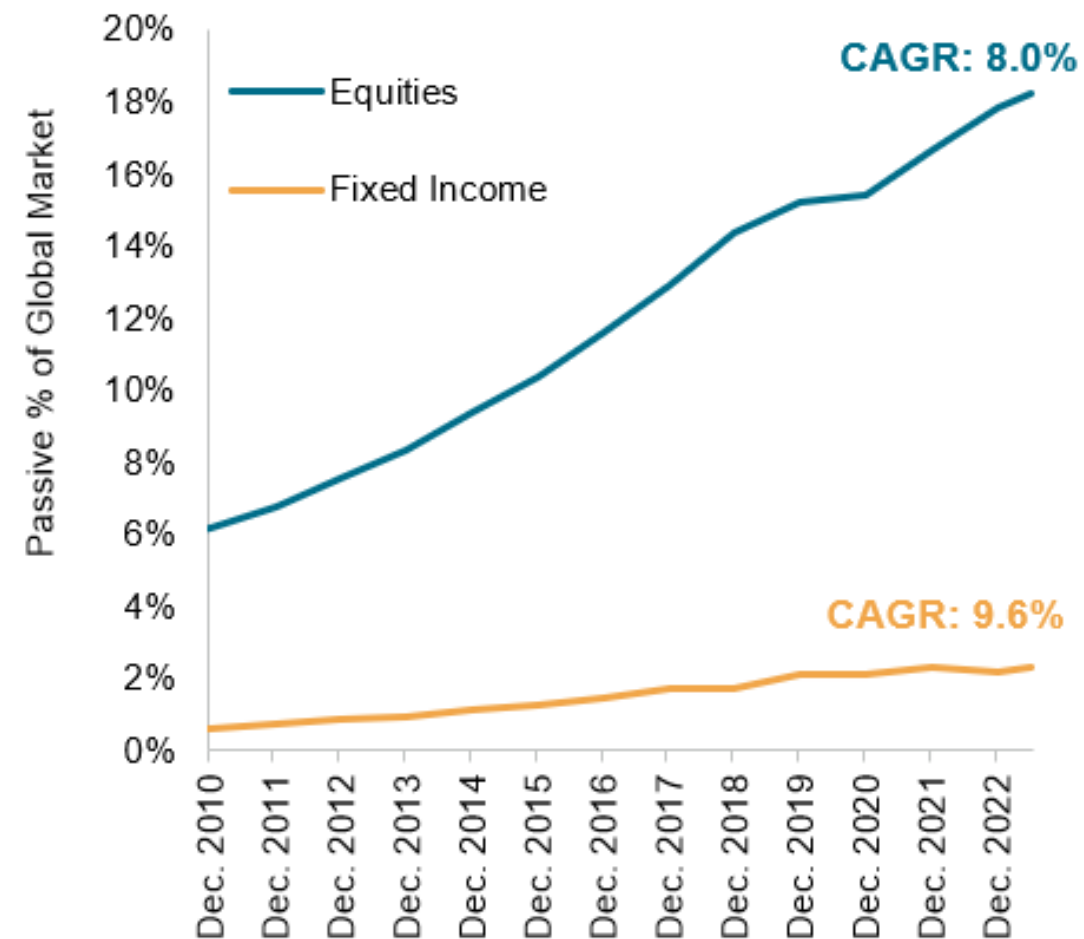
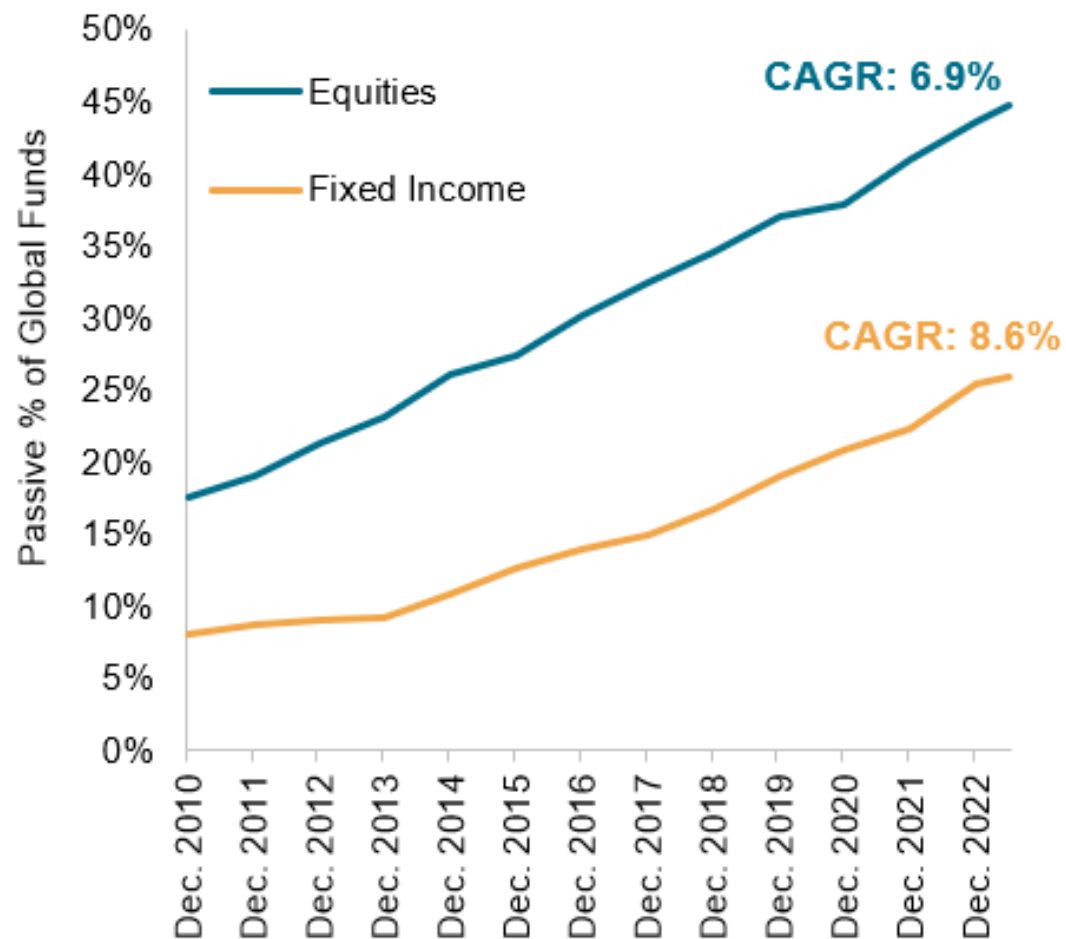
**S&P Dow Jones
Indices**

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October 2024

S&P Dow Jones Indices – For Financial Professionals Only

Growth of Index-Based Mutual Funds, Globally



Source: Reproduced from ["The Hare & The Tortoise: Assessing Passive's Potential in Bonds"](#); S&P DJI Research, 2024. Data as of Dec 31, 2023. Past performance is no guide to future performance. Chart is provided for illustrative purposes.

S&P DJI Survey of Indexed Assets 2023

Headline Indices/Index Series

Index/Series	Indexed Asset Value ¹ (USD Millions)				Benchmarked Asset Value ² (USD Millions)	Total Asset Value (USD Millions)
	ETP ³	Non-ETP ⁴	ETD ⁵	Total		
S&P 500	1,573,659	5,275,923	3,188,710	10,038,293	5,982,231	16,020,524
S&P MidCap 400®	109,536	215,788	11,310	336,634	44,806	381,440
S&P SmallCap 600®	91,393	55,550	100	147,043	11,441	158,484
Dow Jones Industrial Average®	36,773	39,973	25,250	101,996	1,826	103,822
S&P Global BMI	31,388	549	-	31,937	59,654	91,591
iBoxx Corporate	104,756	28,232	100	133,088	285,221	418,309
S&P/ASX Indices	22,105	45,704	34,440	102,250	180,170	282,420
S&P/TSX Indices	35,086	23,486	45,440	104,012	559,619	663,631

Complete S&P Dow Jones Indices⁶

Index/Series	Indexed Asset Value ¹ (USD Millions)				Benchmarked Asset Value ² (USD Millions)	Total Asset Value (USD Millions)
	ETP ³	Non-ETP ⁴	ETD ⁵	Total		
U.S. Equity	2,342,696	6,140,812	3,250,870	11,734,378	6,218,836	17,953,214
Global Equity	163,501	89,182	81,280	333,963	843,565	1,177,528
Fixed Income	179,304	78,766	200	258,270	804,357	1,062,627
Multi-Asset & Alternatives	42,318	91,300	10,040	143,657	856,599	1,000,256
Factors & Thematics	568,884	118,557	-	687,441	198,713	886,154
Total	3,296,702	6,518,617	3,342,390	13,157,709	8,922,070	22,079,779

1 Indexed assets are assets in and/or notional value of institutional funds, ETFs, retail mutual funds, exchange-traded derivatives and other investable products that seek to replicate or capture the performance of the respective S&P DJI indices. 2 Benchmark assets are assets in actively managed funds whose performance are compared to or measured against the respective S&P DJI indices. 3 Exchange-Traded Products (ETPs) include Exchange-Traded Funds (ETFs), Exchange-Traded Notes (ETNs), and Exchange-Traded Commodities (ETCs). 4 Non-ETP assets include mutual funds, institutional funds, separately managed accounts and insurance products. 5 Exchange-Traded Derivatives (ETDs) include exchange-traded options, exchange-traded futures and exchange-traded options on futures. The notional conversion methodology for derivatives is based on publicly available exchange data. While the volumes and open interest (OI) are published by the exchanges, the notional conversion is performed independently using a multiplier of .23. 6 The asset values associated with the Headline indices are featured in their respective categories on the Complete S&P Dow Jones Indices table. 7 Multi-Asset & Alternatives include GSCI, Crypto, Target Date / Target Risk, other Alternatives and other Multi-Asset 8 Factors & Thematics include Dividends, Style, Equal Weight and other Factor indices. Source: S&P Dow Jones Indices LLC, S&P Dow Jones Indices client-reported data, eVestment, FIA and Morningstar Inc. Asset values as of Dec. 31, 2023. Table is provided for illustrative purposes. Note: The numbers set forth above are estimates of the total global assets in and/or notional value of the financial products based on or benchmarked to S&P DJI indices. These are indicative only and include assets in active funds that are benchmarked to S&P DJI indices for performance measurement as well as assets of financial products that use or are based on the respective S&P DJI indices to create such product. S&P Dow Jones Indices does not guarantee the accuracy of these data. To create a comprehensive view of assets, S&P DJI uses a wide range of data, including third party data and S&P DJI client-reported data collected via an annual survey. Not all companies respond or choose to be included in such survey. There will be variability year to year due to various factors that impact the results, including, for example, the timing and robustness of market participants' reporting, market performance and S&P DJI's ongoing data cleansing and methodology enhancements to improve the quality and accuracy of the survey results.

Source: S&P Dow Jones Indices LLC. Data as of December 29, 2023. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

S&P Dow Jones Indices

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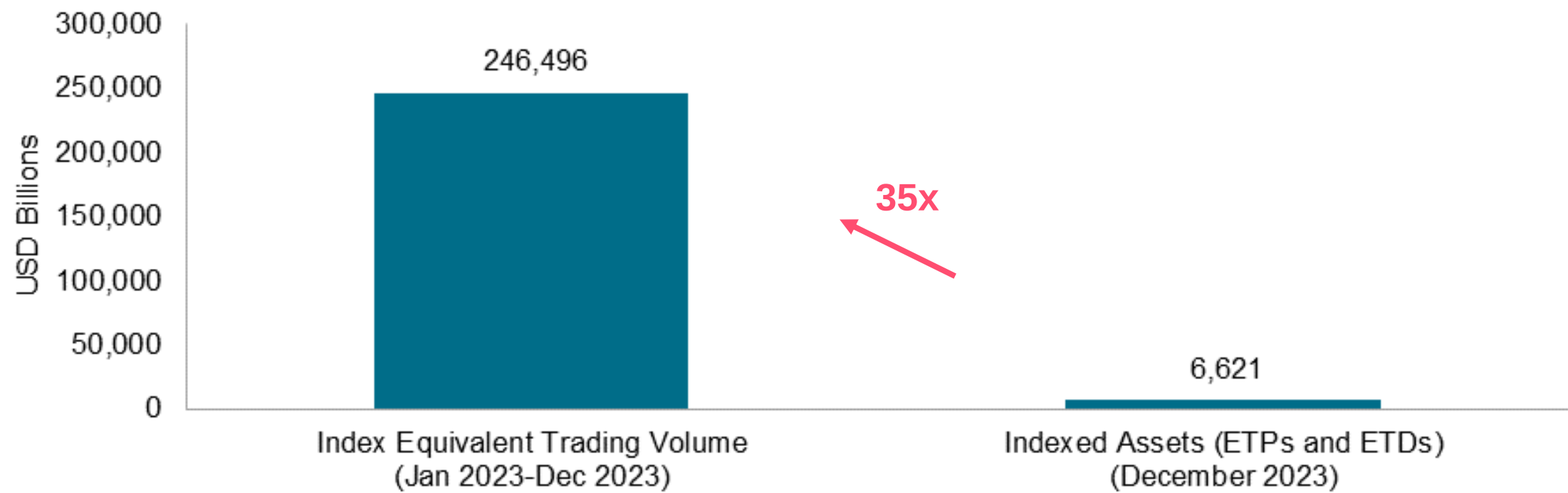
S&P DJI's Trading Ecosystem

Index Equivalent Trading Volume of S&P DJI Indices (USD Billions, 2023)

INDEX CATEGORY	TOTAL	FUTURES	OPTIONS	ETPS
U.S. BROAD EQUITY				
S&P 500	223,862	102,244	109,608	12,009
Dow Jones Industrial Average	8,466	7,733	136	598
S&P MidCap 400®	1,089	883	2.6	203
INTERNATIONAL EQUITY				
S&P/ASX 200	1,935	1,832	91	12
S&P/TSX 60	1530	1,479	5	46
EQUITY SECTORS				
S&P 500 Sectors	3,505	349	220	2,936
Other Equity Sector	1,908	38	223	1,648
FIXED INCOME				
iBoxx HY	1,013	10	180	824
iBoxx IG	634	9	31	595
OTHER				
VIX® and Equity Derivatives	1,286	906	138	243
All Other S&P DJI Index-Linked Products	895	26	3	865

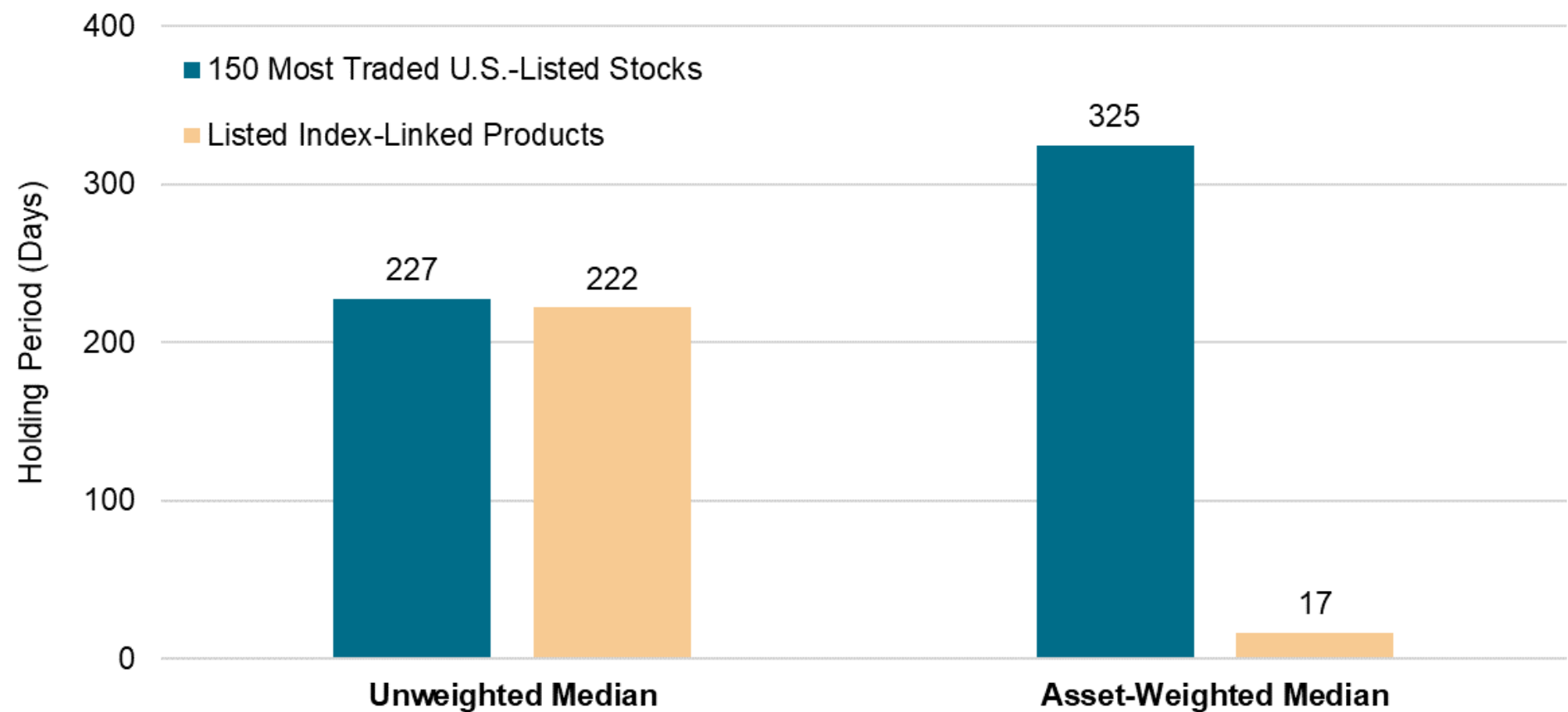
Source: S&P Dow Jones Indices LLC, FIA, Bloomberg. Data as of Dec 31, 2023. Each product was placed into one of three product categories: futures, options, and ETPs, the latter of which includes “vanilla” ETFs and less common structures such as leveraged and inverse ETFs, and exchange-traded notes (ETNs). Note that the options column includes both options linked to indices and options on index-linked ETPs. Notional volumes were adjusted for the degree of economic exposure to the underlying index. Further details are provided in the paper: [“The Liquidity Landscape: Trading Linked to S&P DJI Indices”](#) (2024)

Assets vs Volumes (S&P DJI Index-Linked Products)



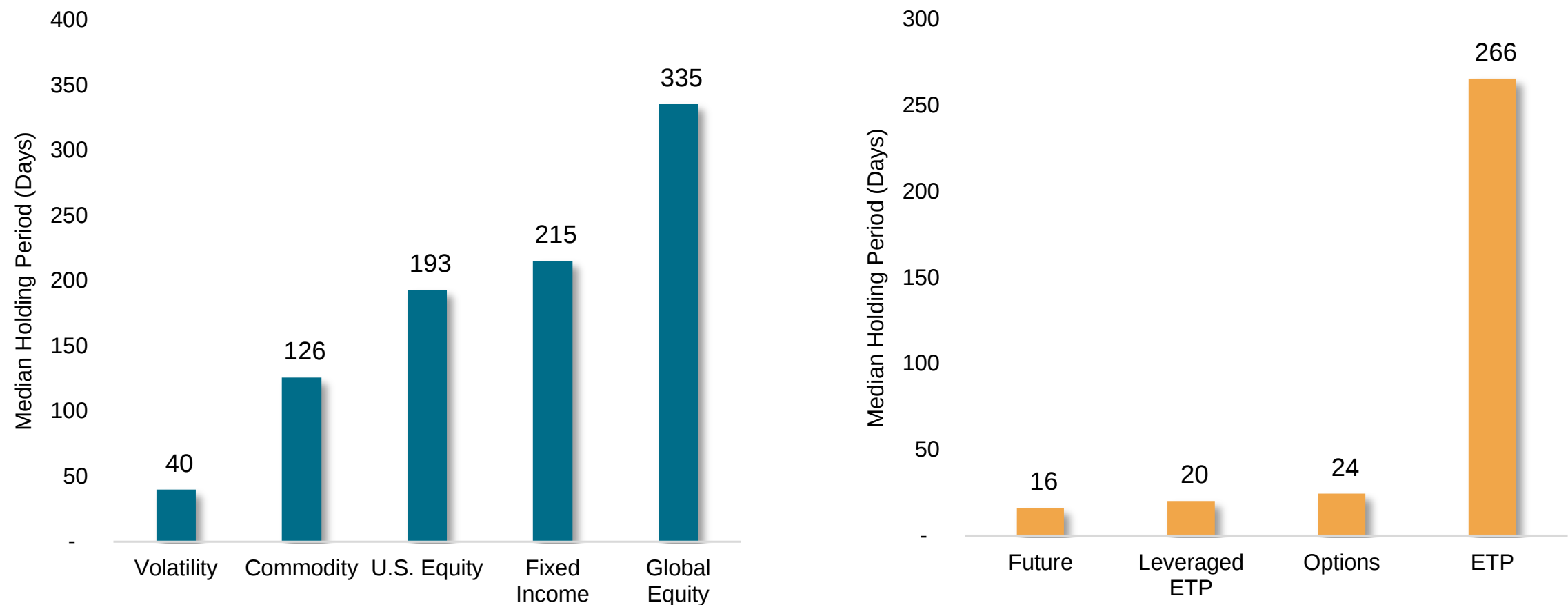
Source: S&P Dow Jones Indices LLC, FIA, Bloomberg. Data as of Dec 31, 2023. Chart is provided for illustrative purposes.

How Active are Index-Based Product Users? A Comparison



Sources: Bloomberg LLC, FIA, S&P Dow Jones Indices' research October 2024. Data as of Dec 31, 2023. See also "Active and Passive Harmonics: Trading Frequencies in Index-Linked Products"; Journal of Beta Investment Strategies *forthcoming*.

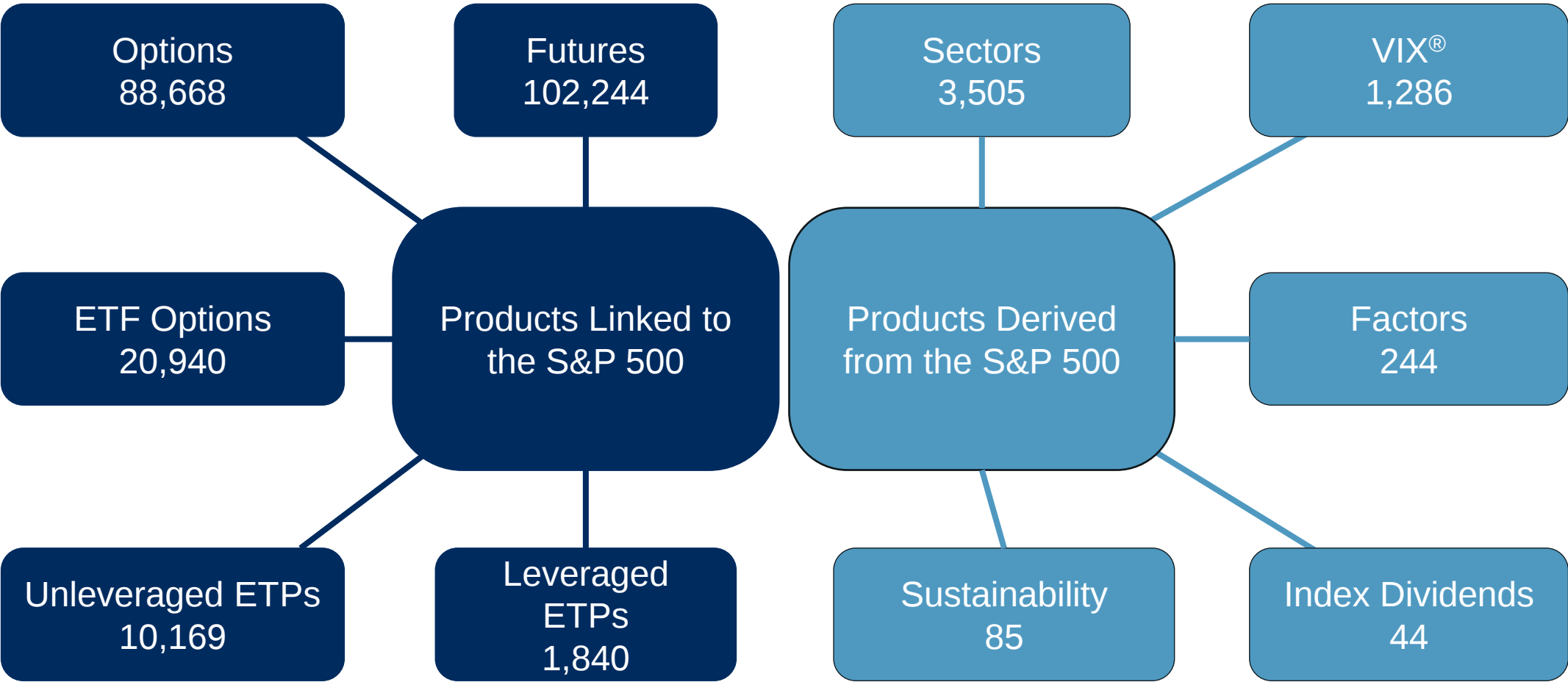
Median Holding Periods by Asset Class & Product Type



Source: Based on "Index Equivalent Trading Volumes" as defined in ["The Liquidity Landscape"](#) S&P Dow Jones Indices' research October 2024. Volumes were adjusted for the degree of short-term index sensitivity, including estimates of average delta for options volume. Other sources included FIA, Bloomberg and various product issuers. Data as of Dec 31, 2023.

Index Volumes Linked to the S&P 500® (Full Year 2023)

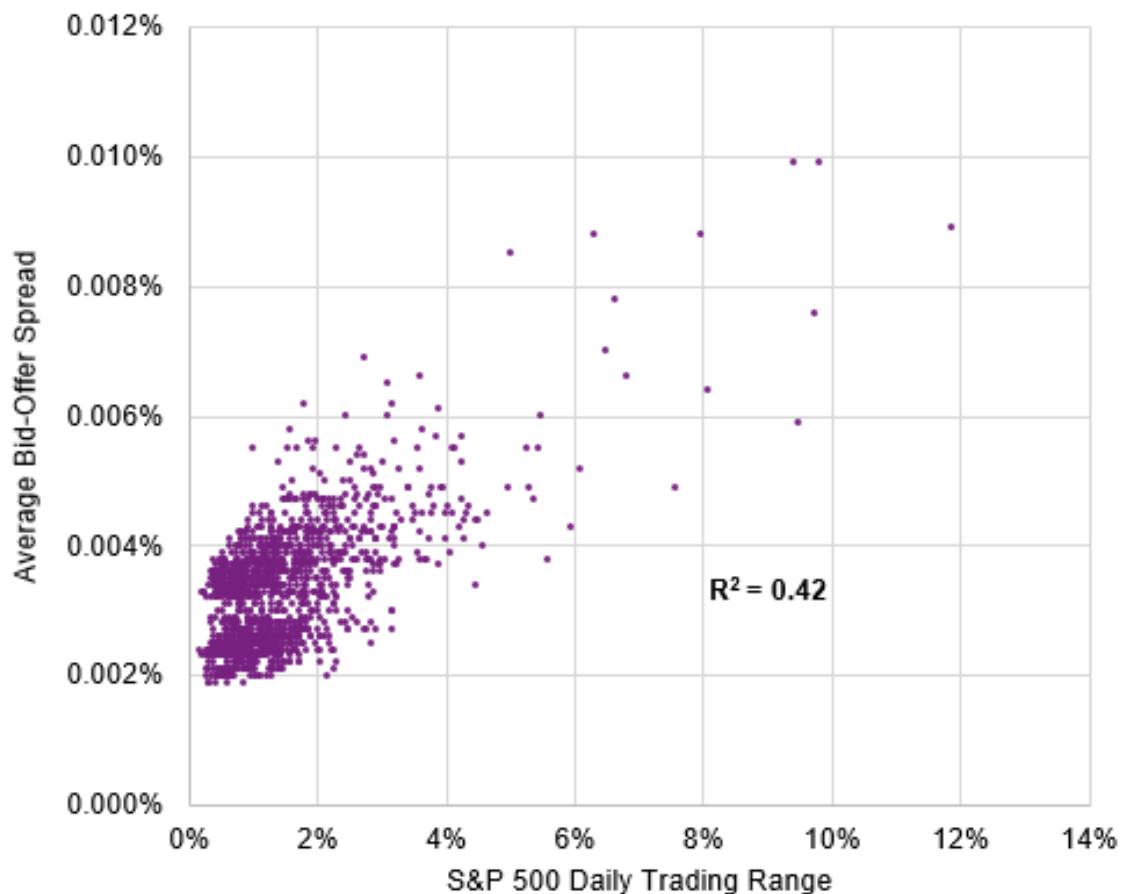
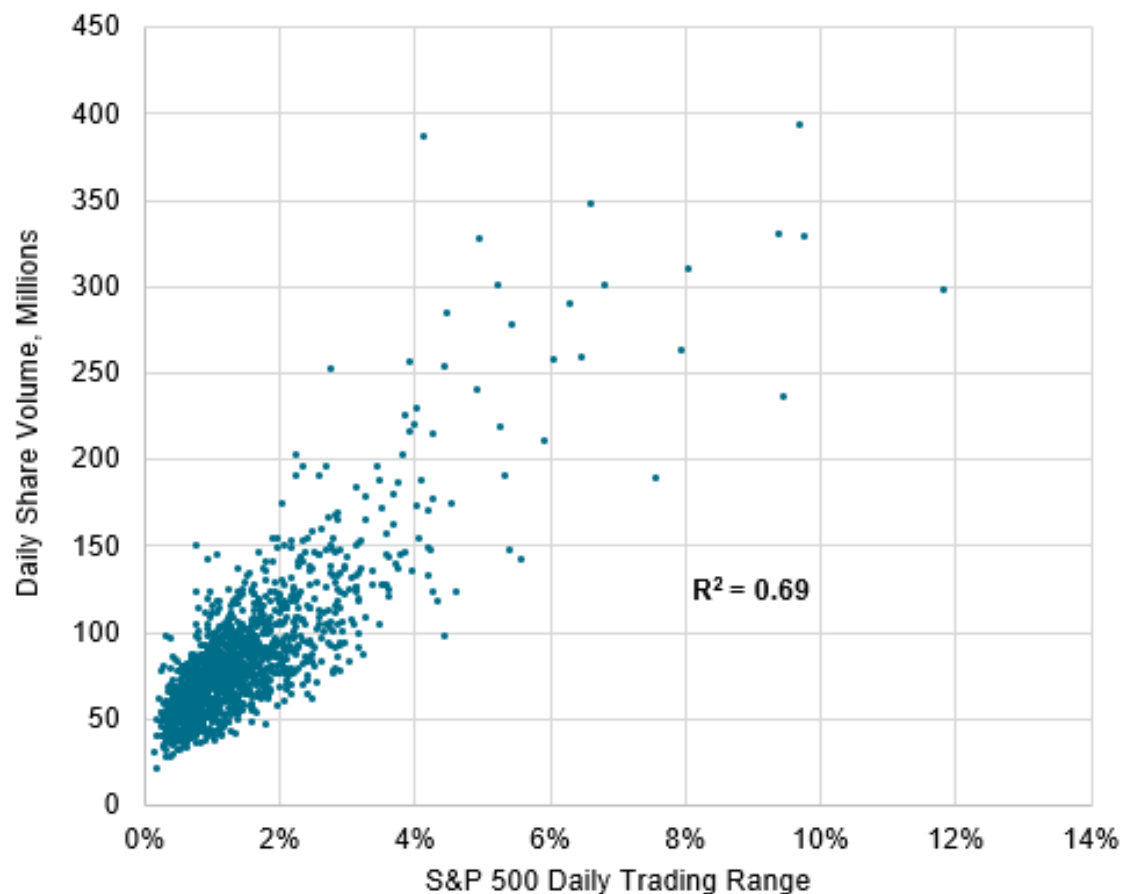
The S&P 500 Ecosystem – Aggregate Index Equivalent Trading Volume in Billions of U.S. Dollars



Source: Based on "Index Equivalent Trading Volumes" as defined in ["The Liquidity Landscape"](#) S&P Dow Jones Indices' research October 2024. Volumes were adjusted for the degree of short-term index sensitivity, including estimates of average delta for options volume. Other sources included FIA, Bloomberg and various product issuers. Data as of Dec 31, 2023.

Liquidity can be Most Needed when it is Most Difficult

Historical Trading Statistics 1 Jan. 2019 to 30 Sep. 2024, Largest S&P 500-linked ETF



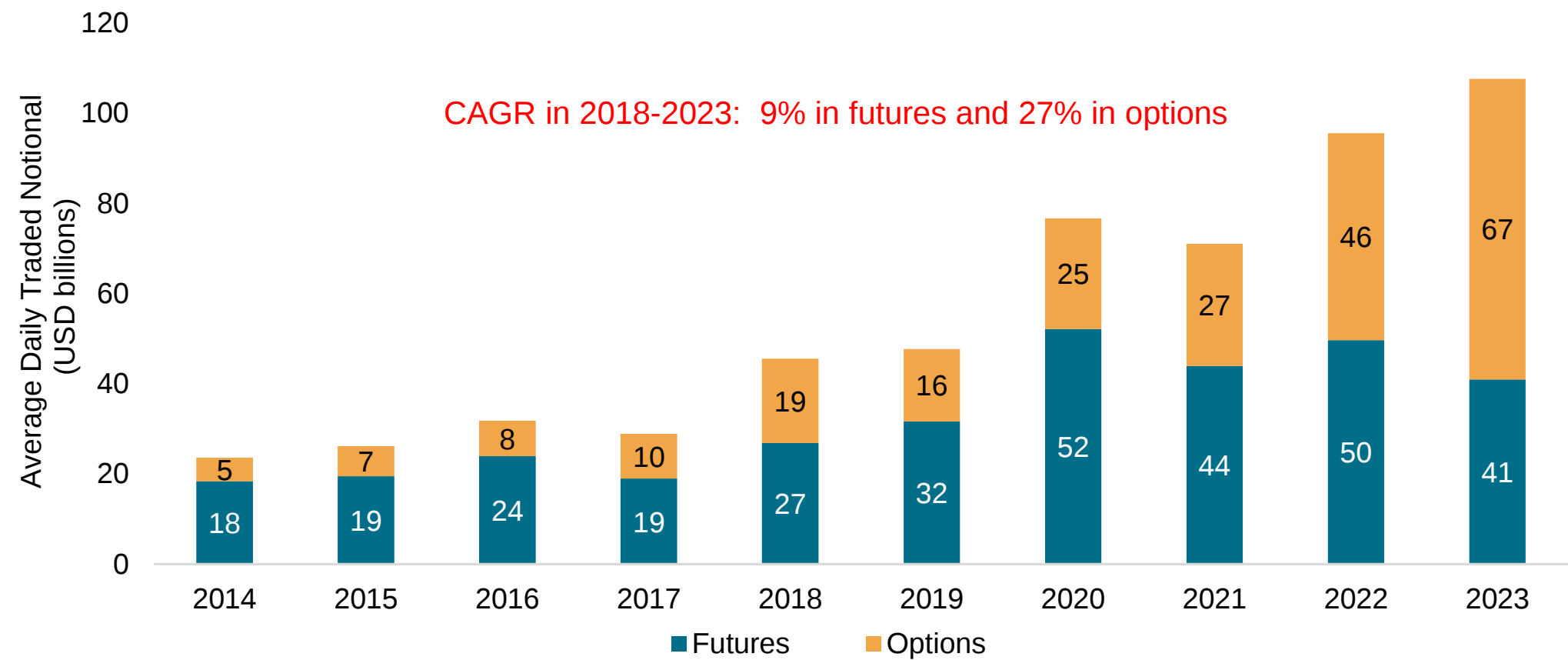
Source: S&P Dow Jones Indices LLC, State Street, Bloomberg. Data as of Sep. 30, 2024. Chart is provided for illustrative purposes.

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S&P 500 Liquidity “Around The Clock”

S&P 500 Listed Derivatives Non-U.S. Hour Trading – Average Daily Traded Notional in Billions of U.S. Dollars



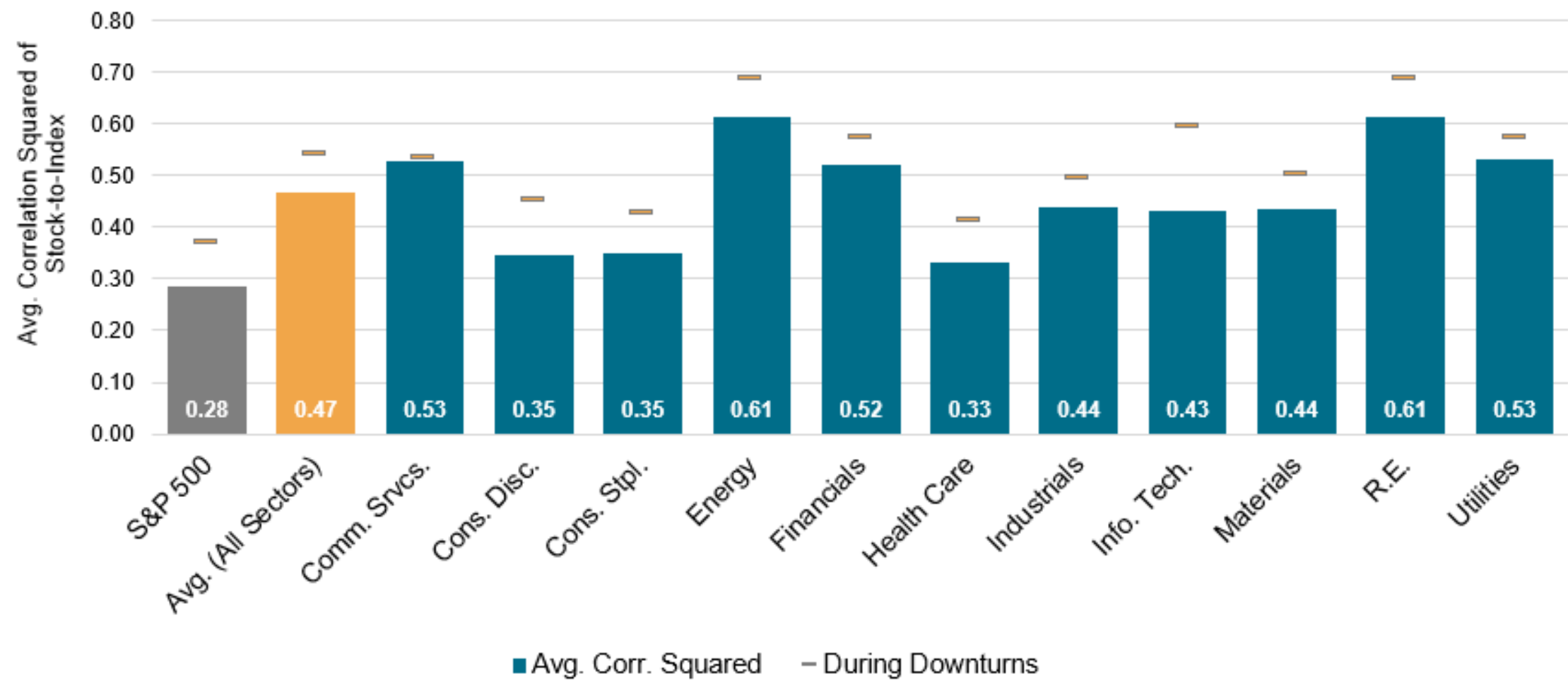
Source: S&P Dow Jones Indices LLC, Cboe, CME, Bloomberg. Data as of Dec 31, 2023. Chart is provided for illustrative purposes.

Evolution of Indexing

Indices	Examples	Attributes
Broad Market	S&P 500®, iBoxx USD Overall, S&P GSCI	- Capitalization-weighted - Aim to represent an asset class
Specialized	S&P 500 Energy, iBoxx 7-10Y U.S. Treasury	- Focus on a subset of the broader market - Typically capitalization-weighted
Factor ("Smart Beta" / Alternatively Weighted)	S&P 500 Low Volatility, S&P High Yield Dividend Aristocrats®	- Focus on specific <i>patterns</i> or <i>characteristics</i> - Better "indicize" active strategies - Typically <i>not</i> capitalization-weighted
Sustainability	S&P 500 ESG iBoxx Global Green Bonds	- Express certain values or investment restrictions - Might be broad or specialized

Source: S&P Dow Jones Indices LLC.

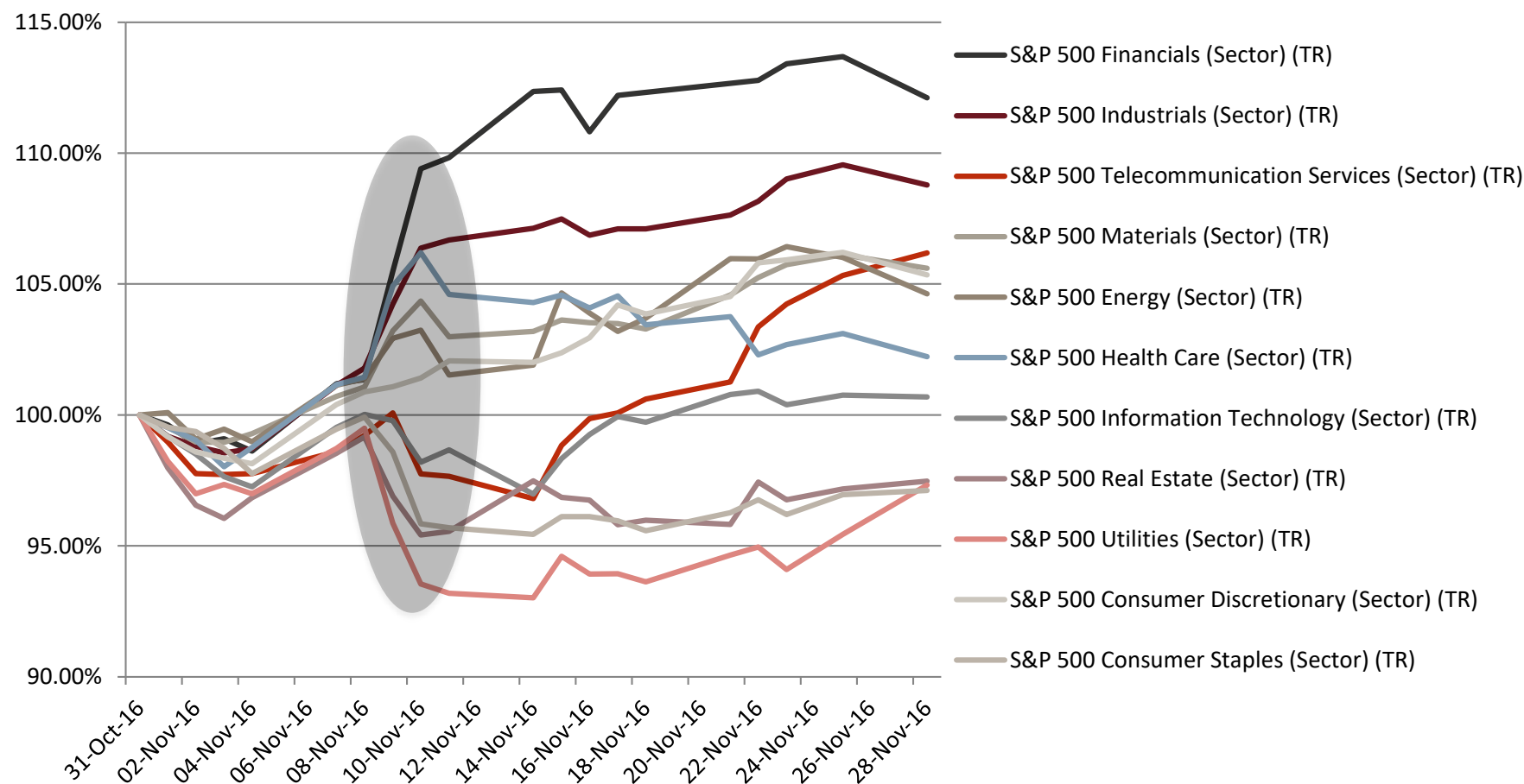
Drivers of S&P 500 Stock Price Fluctuations



Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1999 through Dec. 31, 2023. Data based on average of monthly correlation-squared of stocks to sectors and the S&P 500. Downturn average since 1999 includes peak-to-trough performance during dot-com crash, GFC, COVID-19 emergence, and 2022 bear market. See appendix for date details. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

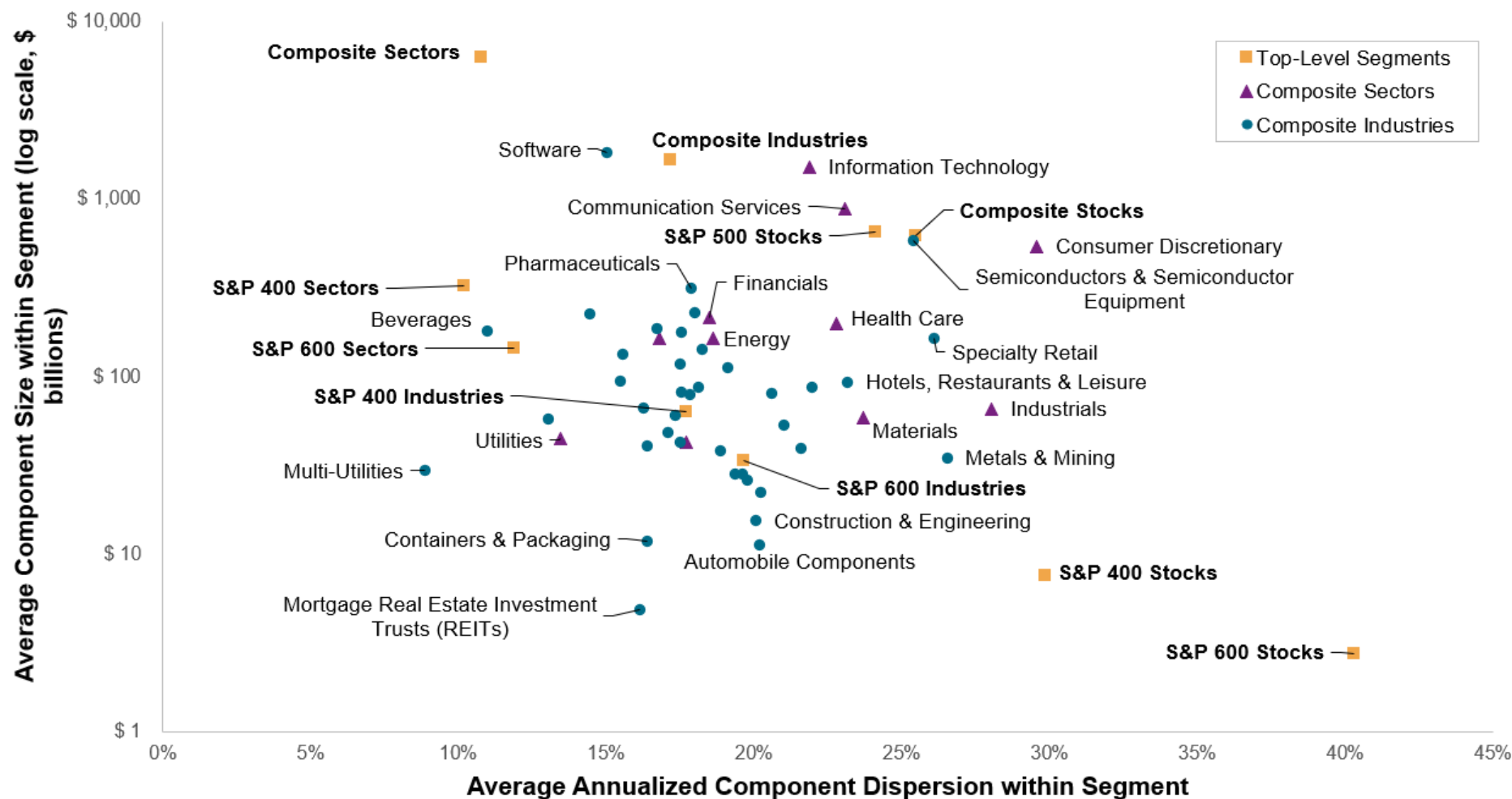
What Kind of Risk?

S&P 500 Sectors and the 2016 U.S. Presidential Election



Source: S&P Dow Jones Indices. Data to November 28th, 2016. Index relative total returns shown in in U.S. dollars. Illustrative purposes only. Past performance is no guide to future performance.

Revisiting the Basics of Active (& Passive) Returns



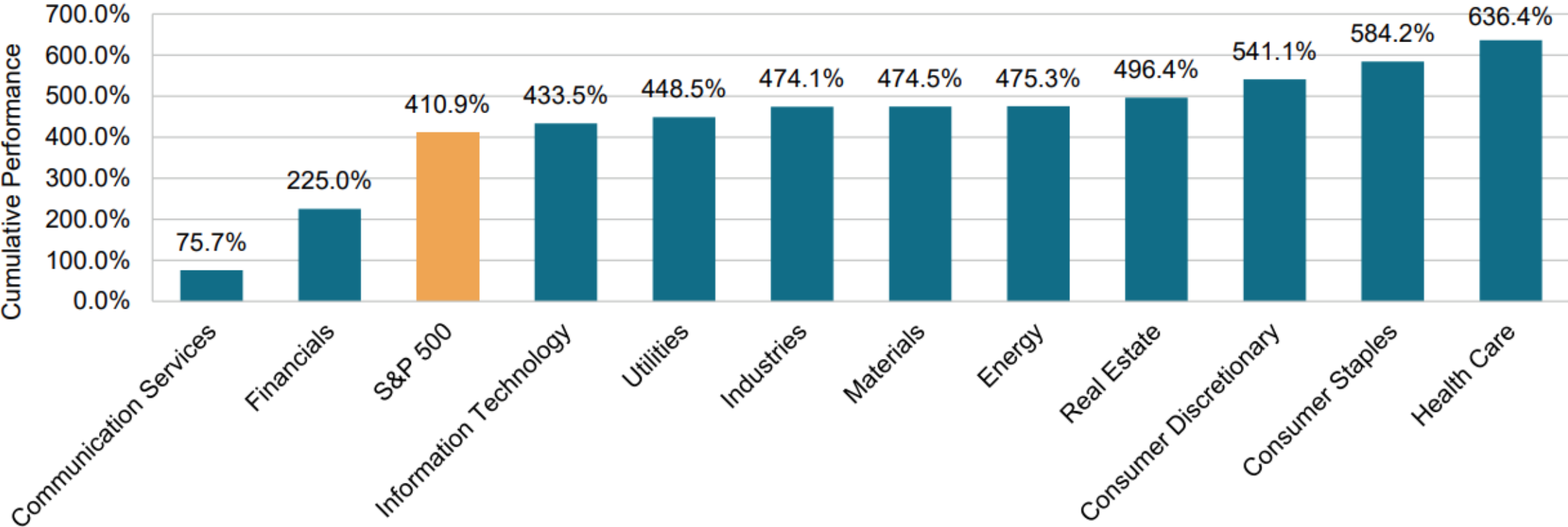
Source: S&P Dow Jones Indices. Based on annualized average calendar-month capitalization-weighted dispersion of the underlying segments during a 36-month period ending 31 December 2023. Average size for each segment is the index-weighted average free float market capitalization as measured at the end of the period. "Composite" refers to the S&P Composite 1500. Chart is provided for illustrative purposes.

The Risk Landscape is Evolving



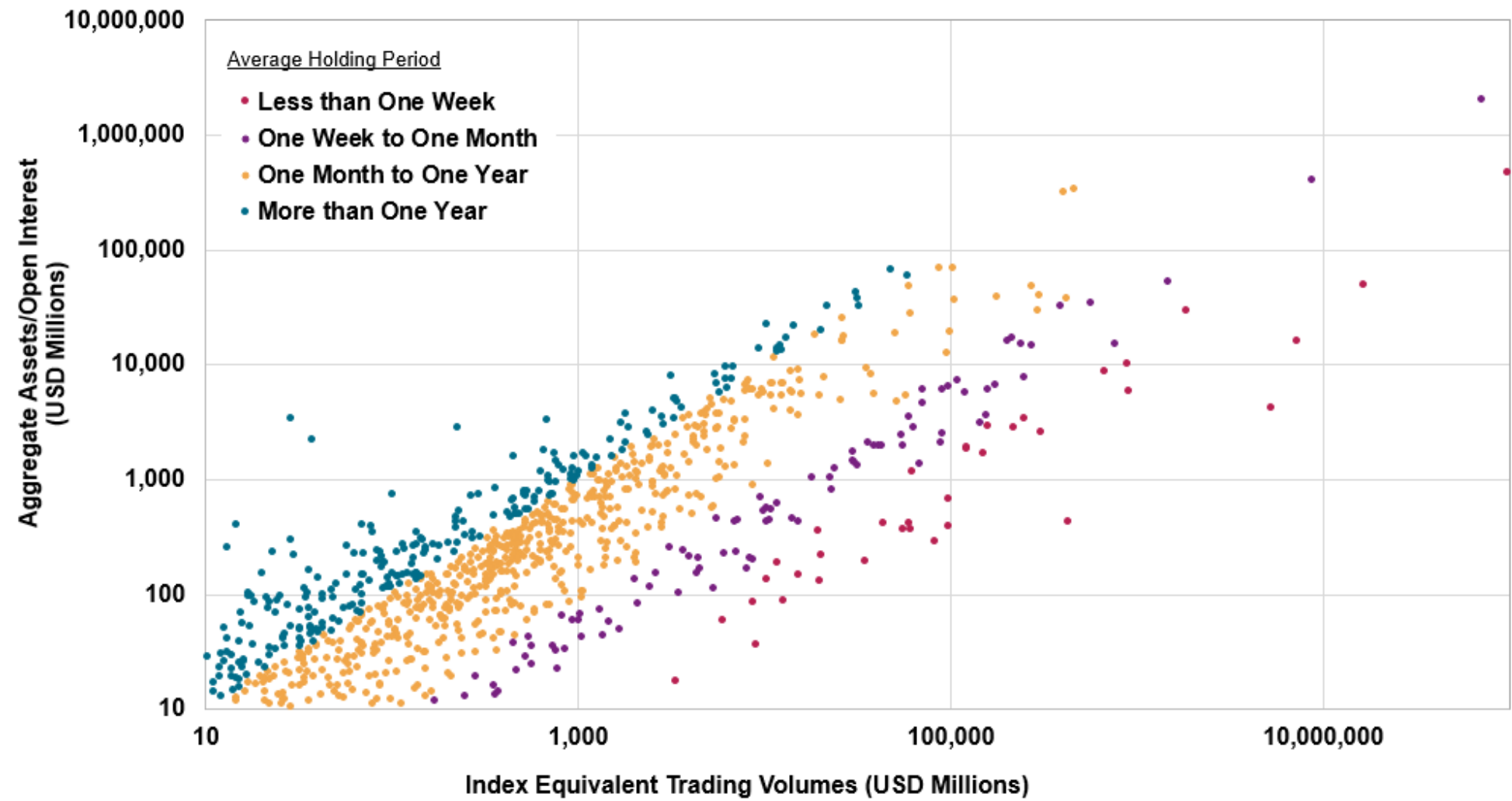
Sources: S&P Dow Jones Indices LLC, Cboe. Data as of Sep 30, 2024. Past performance is no guarantee of future performance. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance. The Dispersion Index was launched Sep. 27, 2023.

Not So Hard to Beat?



Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1999, through Dec. 31, 2023, except for Real Estate from Oct. 9, 2001, through, Dec. 31, 2023. The S&P 500 total return for the concurrent period was 595.2%. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Global Assets & Volumes in S&P DJI-Linked Products



Source: Based on “Index Equivalent Trading Volumes” as defined in “[The Liquidity Landscape](#)” S&P Dow Jones Indices’ research October 2024. Volumes and assets were adjusted for the degree of short-term index sensitivity, including estimates of average delta for options volume. Other sources included FIA, Bloomberg and various product issuers. Data as of Dec 31, 2023.

The Latest S&P DJI Content:

Get an Overview of the Liquidity Landscape

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Research

The Liquidity Landscape: Trading Linked to S&P DJI Indices

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Executive Summary

From short-term traders to long-term passive investors, a healthy trading ecosystem benefits market participants by promoting price transparency, market efficiency and confidence. Updating our analysis from 2019, this paper conducts a survey of the observed volumes and implied holding periods for a global and cross-asset range of listed products tied to indices produced by S&P Dow Jones Indices (S&P DJI). The results offer perspective on the use of indices as the basis for active and passive investment strategies.

- Reported volumes across a range of products tied to S&P DJI's indices evidence highly **active usage of index-linked products**.
- A globalized network of trading is associated with the **S&P 500®** and related indices, with potential **liquidity network effects**.
- We emphasize the impact and relevance of trading in S&P 500-linked products **across time zones** and also spotlight Australia's growing **S&P/ASX 200** ecosystem.

Exhibit 1: S&P DJI Volumes Exceeded the Value of Assets

Metric	Value
Index Equivalent Trading Volume (Jan. 2023 - Dec. 2023)	246,496
Indexed Assets (ETPs and ETDs)	6,621

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2023. See later sections for more details. Chart is provided for illustrative purposes.

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A Window on S&P/ASX Index Liquidity
ASX | May 11, 2023

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Performance Disclosure/Back-Tested Data

The Cboe S&P 500 Dispersion Index was launched on September 27, 2023. All information presented prior to an index's Launch Date is hypothetical (back-tested), not actual performance, and is based on the index methodology in effect on the index launch date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. In addition, forks have not been factored into the back-test data with respect to the S&P Cryptocurrency Indices. For the S&P Cryptocurrency Top 5 & 10 Equal Weight Indices, the custody element of the methodology was not considered; the back-test history is based on the index constituents that meet the custody element as of the Launch Date. Complete index methodology details are available at www.spdji.com. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results.

Please refer to the methodology for the Index 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. Back-tested performance is for use with institutions only; not for use with retail investors.

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 to a fixed value for calculation purposes. The Launch Date designates the date when 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 data feed 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.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate S&P DJI's ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using "Backward Data Assumption" (or pulling back) of ESG data for the calculation of back-tested historical performance. "Backward Data Assumption" is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as "product involvement") were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. For more information on "Backward Data Assumption" please refer to the [FAQ](#). The methodology and factsheets of any index that employs backward assumption in the back-tested history will explicitly state so. The methodology will include an Appendix with a table setting forth the specific data points and relevant time period for which backward projected data was used.

Index returns shown do not represent the results of actual trading of investable assets/securities. S&P Dow Jones Indices 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).