

# S&P Kensho New Economies Quarterly Commentary

*The S&P Kensho New Economy Indices seek to track the industries and innovation of the Fourth Industrial Revolution*

## Contributor

Strategy Product  
Management Team  
[SPDJI-GrowthStrategy](#)  
[@spglobal.com](#)

Global equity markets had a lackluster second quarter this year as they navigated a challenging macro environment. The [S&P 500<sup>®</sup>](#) was down 16% this quarter, posting the worst first-half performance since 1970, with three of its constituent sectors also having their worst first-half performance on record. Other major indices focused on U.S. small-cap equities, global equities and emerging market equities also had multi-year record losses during this first half. The story in the fixed income space was similar, as the Fed's tightening cycle switched into high gear after a 75 bps overnight rate hike in June, the biggest hike since 1994. The speed of rising rates has weighed heavily on the bond and credit markets, as various global and emerging market bond aggregates posted their worst first-half declines on record. The knock-on effects of rising rates, together with soaring inflation, pulled growth equities lower. The Q2 underperformance of the [S&P 500 Growth](#) versus the [S&P 500 Value](#) (-9.5%) was the worst since 2001, and so was the S&P 500 Growth's underperformance versus the S&P 500 (-4.7%). To round off this broad pullback across various market segments, consumer sentiment also fell sharply due to growing concerns of a recession ahead, despite a strong labor market. This combination of uncertainties, especially around underperforming growth equities and downcast investor expectations that S&P Kensho Indices are particularly sensitive to, was a recipe for a difficult Q2 2022.

## Top Three from across the New Economies

**Clean Energy (-7.7%):** KENERGY, which focuses on clean energy production at a utility scale, has had a volatile year so far, similar to the oil complex. After posting one of the best Kensho subsector returns in Q1 2022, it reversed those gains in Q2, while still holding the top spot as the best quarterly performer among Kensho subsectors. Its overweight in Utilities adds a defensive characteristic that likely helped its performance during this market pullback. Despite the recent swings, KENERGY has been relatively stable and rangebound over the past year, and it is now close to its level from one year prior. Brazilian electric company EBS was the top contributor, primarily because of strong investor demand as the company takes steps to go private. Azure Power and Enel Americas were the index's biggest underperformers, with no clear stock-specific catalysts to highlight.

**Smart Borders (-9.4%):** KDMZ, focused on securing borders and critical infrastructure, drifted sideways, ending the quarter nearly flat compared to late January levels. Given the heavy weight of Industrials (~40%) within the index, the chorus of reports of an impending recession have likely weighed on its performance. Griffon Corp, a top performer, had a solid Q1 2022 earnings season that beat consensus analyst estimates and saw its stock gain 37% over the week following the announcement, ending the quarter up 40%. Teledyne Tech was the biggest quarterly underperformer in the index (-20% in Q2 2022), erasing its gains from the brief pickup in the aftermath of the start of the conflict in Ukraine. Embraer was another notable underperformer, not helped by a weak Q1 earnings report, losing 31% in the quarter and now close to a one-year low.

**Space (-10.7%):** After moving within a narrow price range since December 2020, KMARS trended lower for most of the quarter, eventually falling below this range. Rising rates have likely affected the bottom line of this innovative industry as it navigates its relatively early stages of growth. Failed payload delivery added to the woes of Astra Space, which has been plagued by investigations, driving its stock price 65% lower this quarter. Geospatial intelligence firm Maxar was another notable underperformer, registering a return of -33% for the quarter, retracing the bounce in the aftermath of the start of the Russia-Ukraine conflict in February. Northrop Grumman and Aerojet RocketDyne were the top positive contributors to the index performance. Despite Lockheed's deal to acquire Aerojet being scrapped in February, a strong Q1 earnings report and upbeat sales have been supportive for Aerojet's stock price.

# Bottom Three from across the New Economies

**Exhibit 1: S&P Kensho New Economies Performance Dashboard**

Composite Index	QTD	YTD	12-Month
New Economies Composite (KNEX)	-21.7%	-30.8%	-38.6%
New Economies Select (KNESLX)	-21.3%	-30.6%	-38.0%
S&P Composite 1500®	-16.0%	-19.9%	-11.0%
Sector Index	QTD	YTD	12-Month
Clean Power (KPOWER)	-12.3%	-12.6%	-24.8%
Final Frontiers (KEXPLORE)	-14.1%	-11.0%	-16.1%
Future Security (KSECURE)	-16.3%	-15.9%	-14.3%
Human Evolution (KEVOLVE)	-18.1%	-35.8%	-45.6%
Advanced Manufacturing (KMAKE)	-20.9%	-30.6%	-30.5%
Intelligent Infrastructure (KINFRA)	-21.1%	-29.1%	-32.1%
Future Communication (KCONNECT)	-22.7%	-37.1%	-46.8%
Sustainable Staples (KSTAPLE)	-23.3%	-21.1%	-30.1%
Smart Transportation (KMOVE)	-26.4%	-37.5%	-44.0%
Democratized Banking (KFIN)	-26.9%	-37.3%	-50.1%
Subsector Index	QTD	YTD	12-Month
Clean Energy (KENERGY)	-7.7%	-0.3%	-5.3%
Smart Borders (KDMZ)	-9.4%	-18.1%	-20.4%
Space (KMARS)	-13.8%	-10.7%	-17.1%
Genetic Engineering (KDNA)	-15.5%	-35.5%	-46.0%
Drones (KDRONE)	-16.3%	-6.7%	-23.7%
Digital Communities (KSOCIAL)	-16.7%	-31.8%	-52.6%
Cleantech (KCLEAN)	-17.5%	-23.6%	-38.8%
Cyber Security (KCYBER)	-18.3%	-18.0%	-11.0%
Smart Grids (KGRIDS)	-19.4%	-24.4%	-29.9%
Nanotechnology (KNANO)	-20.1%	-36.3%	-48.6%
Wearables (KBORG)	-20.3%	-27.8%	-31.5%
Robotics (KBOTS)	-20.7%	-30.6%	-32.2%
Smart Factories (KFACT)	-21.2%	-30.1%	-29.6%
Smart Buildings (KHOME)	-21.5%	-35.0%	-41.5%
Electric Vehicles (KEV)	-23.2%	-33.3%	-45.8%
Digital Health (KDOC)	-23.4%	-36.1%	-46.9%
Future Payments (KPAY)	-23.8%	-32.4%	-45.0%
Sustainable Farming (KFARM)	-24.0%	-22.1%	-32.8%
3D Printing (KDDDP)	-25.2%	-25.0%	-44.9%
Virtual Reality (KVR)	-26.0%	-40.4%	-42.1%
Autonomous Vehicles (KCARS)	-26.0%	-43.9%	-43.6%
Enterprise Collaboration (KTEAM)	-29.5%	-40.9%	-39.3%
Alternative Finance (KALTFIN)	-29.8%	-38.9%	-50.9%
Advanced Transport Systems (KATS)	-31.8%	-42.7%	-47.6%
Distributed Ledger (KLEDGER)	-48.9%	-60.5%	-73.5%

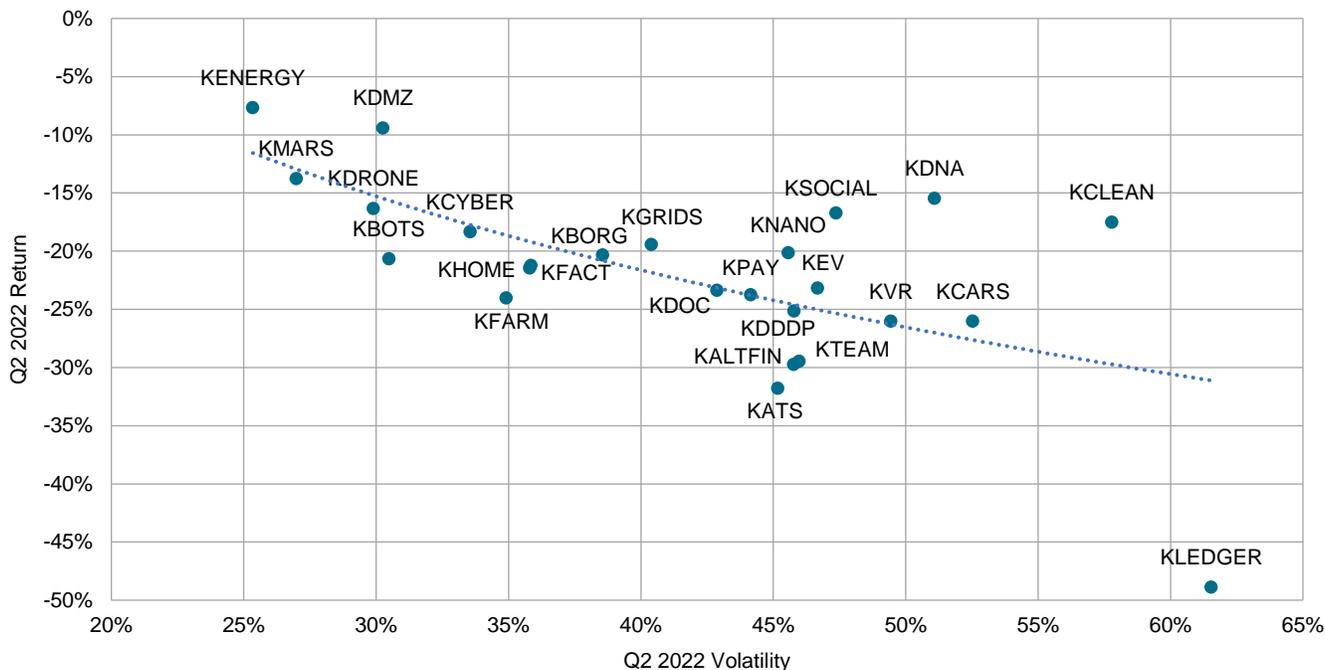
Source: S&P Dow Jones Indices LLC. Data as of June 30, 2022. Index performance based on total return in USD. Index tickers shown in parentheses. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

**Distributed Ledger (-48.9%)**: Drawdown in the equity and bond markets, exacerbated by souring investor sentiment and consumer confidence, was a hallmark of this quarter's backdrop. Cryptocurrency and blockchain-related assets bore the brunt of this reversal in sentiment during a period of weakening growth and rising inflation. Similar to its Q1 2022 performance, Distributed Ledger was the biggest underperformer in Q2 2022 among Kensho Subsectors. RIOT and Marathon, players in the crypto mining industry, which is one of the most exposed to the price of crypto assets, were the biggest contributors to KELDGER's Q2 underperformance. Coinbase was another close contender for this list, after falling crypto trading volumes hurt its Q1 2022 earnings, which were below analysts' estimates. The areas that are relatively less sensitive to cryptocurrency prices (e.g., blockchain adopters and developers) fared comparatively better but were overshadowed by other segments within the index. KLEDGER has now given up its post-pandemic gains and is near its lowest level since its inception in 2018.

**Advanced Transport Systems (-31.8%)**: Notwithstanding the continued normalization of travel after the 2020 pause, KATS performance was weighed down by rising oil prices along with overall inflation and economic growth concerns. Lyft had its biggest one-day stock price fall (~30%) after its Q1 2022 earnings announcement, eventually losing nearly 65% during Q2. Blade Air, a small-cap stock with negative earnings, has also struggled in this rising rate environment and fell by 50% this quarter. Avis and Uber were other negative index performance contributors that were likely affected from overall industry growth concerns in the near term rather than stock-specific news. Of the 20 stocks in the index, 18 registered negative contributions to the Q2 2022 performance, highlighting the current cost pressures faced by this segment.

**Alternative Finance (-29.8%)**: The large-cap S&P 500 Financials sector was down 17.5% this quarter. This performance was amplified on the downside by KALTFIN, which focuses on the growth and innovative segments within Financials. The downbeat performance was broad based, as a pullback in cryptocurrency assets dented retail risk appetite, and rising loan rates contributed as well. Coinbase was the biggest underperformer in the index, followed by Upstart and Paysafe. Upstart was down 37% in June, as its special status that exempted it from violations of fair lending laws was terminated. Paysafe, an online payment processor, has been steadily drifting lower since its IPO via a SPAC merger, due to investor concerns about its revenue growth as it has been buffeted by weakening consumer sentiment.

### Exhibit 2: S&P Kensho New Economies Subsectors Performance Profiles



Source: S&P Dow Jones Indices LLC. Data as of June 30, 2022. Past performance is no guarantee of future results. Index performance based on total return in USD. Chart is provided for illustrative purposes.

## Commentary from across the New Economies

### Distributed Ledger

Despite a decline in most cryptocurrency-related assets, distributed ledger technology (DLT) continues to make inroads into various sectors, from the Energy industry ([link](#)) to supply chain logistics ([link](#)). New government entrants ([link](#), [link](#)) into the digital ID space have underscored the role of civil infrastructure applications of blockchain technology. An increasing embrace of DLT has arguably increased the regulatory scrutiny, which in the long term will likely support a worldwide adoption of this technology, across both public and private sectors. The EU introduced a pilot program that sets operational requirements and supervision rules around DLT frameworks for market infrastructures ([link](#)). Along similar lines, the U.S. Department of Commerce has initiated a consultation soliciting comments on ways to promote U.S. strength in the digital assets space, while minimizing the systemic risks and increasing consumer and business safeguards ([link](#)). Various U.S. states also have been looking at ways to increase adoption of DLT frameworks to improve efficiency and security of state-administered programs ([link](#)).

## Alternative Financing

Cryptocurrencies' ride since the start of the pandemic has added to their widespread appeal even among seasoned professional investors ([link](#)), arguing for the foundational technology's long-term structural upward trend. As the popularity of crowdfunding platforms grows in a rising rate environment, Canada has stepped up its anti-money laundering regulations around these entities ([link](#)). In a push toward further transparency with online loan approval sites, the Consumer Financial Protection Bureau has set stringent standards for companies to provide verifiable explanations for denying any credit requests, and cannot overly rely on the "algorithmic decision-making" justification ([link](#)). On a related note, blockchain's privacy and verifiability feature is slowly finding its acceptance in the mortgage lending space ([link](#), [link](#)). Insurance, a particularly data-intensive and record-keeping-focused industry, has been seeking ways to use innovative technology to expand into the realm of on-demand insurance ([link](#), [link](#)). Wealth management platforms have also increasingly sought to incorporate data-driven solution providers into their fold to sharpen their competitive edge ([link](#), [link](#)).

## Future Payments

The flood of demand from online sales during the pandemic has necessitated corporations upgrading and expanding their payment infrastructure. Credit unions have been undergoing somewhat of a revolution, working to update their offerings as their customers show preference for institutions with mobile and online payment capabilities ([link](#)). Mobile wallets have become an important criterion for consumer convenience ([link](#)). While many central banks are looking to launch their own digital currencies, Ghana's central bank recently launched GhanaPay, a mobile wallet that can be used by individuals and businesses without the need to have a traditional bank account ([link](#)). The popularity of buy now pay later (BNPL) loans has brought a new entrant into this already crowded market ([link](#)). Apple Pay mobile wallet has added the BNPL feature to its offerings via an internal subsidiary, a big step demonstrating Apple's ambitions for the financial services world. Across the border, Canada's upgrade to its payment infrastructure via the Real-Time Rail (RTR) project is bringing real-time payments to Canadian clients ([link](#)). The payroll industry is another area that's seeing innovation through the rollout of real-time payrolls feature. Paychex launched the real-time payments function on its HR solutions platform, which leverages The Clearing House's real-time payments (RTP) system ([link](#)). The cross-border payments space has also witnessed new entrants into the market ([link](#), [link](#)).

## Digital Health

Aggravated staffing shortages within the healthcare industry since the start of the COVID-19 pandemic have renewed the focus on technology-based solutions to address this problem ([link](#)). The U.K. government has published guidelines around improving its healthcare system by leveraging the power of big data, remote patient monitoring and other tools, along with dedicated funding plans for this ambitious rollout ([link](#)). In the U.S., the FDA approved Philips Capsule Surveillance's product that securely streams remote patient monitoring (RPM) data to caregivers to support their decision-making process ([link](#)). The concept of using videogames as prescriptions for mental health issues has been gaining more attention as companies begin to define this fledgling space. After Akili Interactive received FDA approval for its EndeavorRx product, it has recently partnered with Roblox for their distribution channel effort ([link](#)). DeepWell, also a player in this space, intends to build an entire framework to help developers build custom games for various mental health conditions ([link](#)). In related news, the FDA has approved Rune Labs' StrivePD app for the Apple Watch that monitors patient data for a neurological diagnosis of Parkinson's disease ([link](#)). RPM device Biobeat was approved by the FDA; the device monitors patient blood pressure and oxygen saturation, in addition to providing predictive analytics based on this collected data ([link](#)). Another focus area for KDOC, cloud solutions for medical records administration, saw activity as two U.K. hospitals collaborating with a technology firm move their pathology-related data into the cloud for ease of access and remote diagnosis ([link](#)).

## Smart Factories

The Industry 4.0 goals of automation and cloud computing have been highlighted as requiring an upgrade to our communication protocols and systems. A recent report from Wireless Broadband Alliance gave an update on the WiFi 6E capabilities and use cases in the modern factories ([link](#)). Deloitte opened a new smart factory in Kansas, showcasing a model for the future in which factories leverage technology to adapt in real time to market factors and engineering challenges. Abu Dhabi Department of Economic Development, in partnership with GE Digital, is looking at ways to hasten the digital transformation of their manufacturing sector ([link](#)). In support of the Industrial Internet of Things (IIoT) model, Moxa introduced new gateway hardware that is optimized and designed for connectivity to the Microsoft's Azure Edge platform ([link](#)). Computer vision hardware, a cornerstone of real-time diagnostics, had two new product launches that emphasize resolution and accuracy even under physically challenging work conditions. Investments into the development of IIoT infrastructure and applications has not just been a developed markets story; Brazilian telecom firm TIM is investing in upgrades to its communication infrastructure with the aim of developing IoT applications within the agribusiness, mining, healthcare, logistics and utilities industries ([link](#)). Cisco's Webex Hologram has a new user in McLaren Racing, which has used this tool in their

design and manufacturing process for seamless collaboration among their international teams ([link](#)).

## Drones

Governments continue to drive spending in drone technology, mainly in the defense sector, but the area outside defense is growing rapidly. India's government plans to be a drone manufacturing hub for the world ([link](#)) and one critical domestic need is the use of drones to help increase crop production ([link](#)). Mapping thick forests has been a challenge, as ease of access and technological issues have hindered the ability to detail these areas. Drone swarms have been tested in China through bamboo forests ([link](#)) and will aid in the future to assist in the event of a natural disaster. The Russia-Ukraine conflict has also highlighted that drone technology is a critical tool in conflicts; a Turkish company, BayKar, has provided Ukraine with drones that have been extremely effective when put in use ([link](#)). Counter-drones are being developed rapidly to be more functional when activated; an Australian company, DroneShield, has created drones to effectively counter other drones with the use of their VIP Dome, a mini version of the Iron Dome ([link](#)).

## Clean Energy

Large traditional energy players are making major inroads in clean energy as the world pushes for a transition away from fossil fuels. Even with tight supply chain constraints, the International Energy Agency has seen an increase in spending this year of 8%, mostly in renewables and grids ([link](#)). BP and Thyssenkrupp have partnered to generate power from green hydrogen and solar power for steel production ([link](#)). Earlier this year, BP also announced a 40% stake in the Asian Renewable Energy Hub. It will start generating solar and wind, but with potential to produce green hydrogen in the future ([link](#)).

## CleanTech

Across the world, record temperatures are being set this summer; in turn, we are seeing record investment in climate-related technologies. The U.S. government has removed tariffs on Cambodia, Malaysia, Thailand and Vietnam for solar panel imports. It has kept the tariffs on Chinese imports, as the solar industry is largely dominated by Chinese corporations ([link](#)). This policy action will allow more solar panels to be imported into the U.S. and hopefully implemented on a larger scale. Battery storage is critical in clean technologies; however, the current capacity is lacking immensely. Recognizing the need for increased battery production among developed nations, an estimated USD 20 billion will be invested in battery storage in 2022, along with low emissions CO2 and hydrogen technology ([link](#)). The U.S. Department of Energy and Israel's Ministry of Energy have agreed to jointly develop clean technologies for the betterment of both countries ([link](#)).

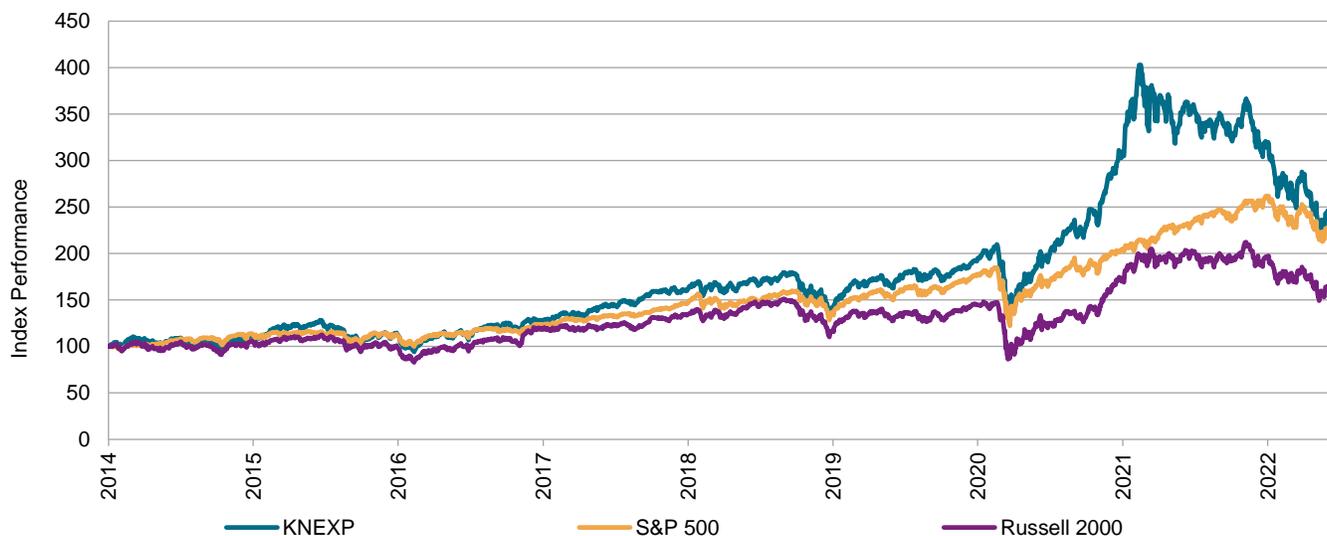
## Sustainable Farming

Rising temperatures and ongoing conflicts around the world, such as the Russia-Ukraine conflict, have affected major parts of the farming industry. Concerns surrounding food availability due to lack of access to necessities such as fertilizers are having an impact on global food security. The price of synthetic fertilizers has doubled since 2021 and the U.S. government has created initiatives to find alternatives to reduce costs for farmers' critical needs ([link](#), [link](#)). Global food security is stressed due to continued COVID-19 supply chain issues and soaring temperatures in less developed nations. Investments in sustainable farming in India and Morocco have led to increased crop production. These investments have been in key areas such as irrigation or agritech, which will increase production as crops become more resilient ([link](#), [link](#)). Food security among western European countries has also become an issue. The U.K. is providing GBP 270 million for investment purposes, which will increase British farmers' access to sustainable farming for crops that are usually imported ([link](#)).

## Relative Performance of the New Economies Composite Index

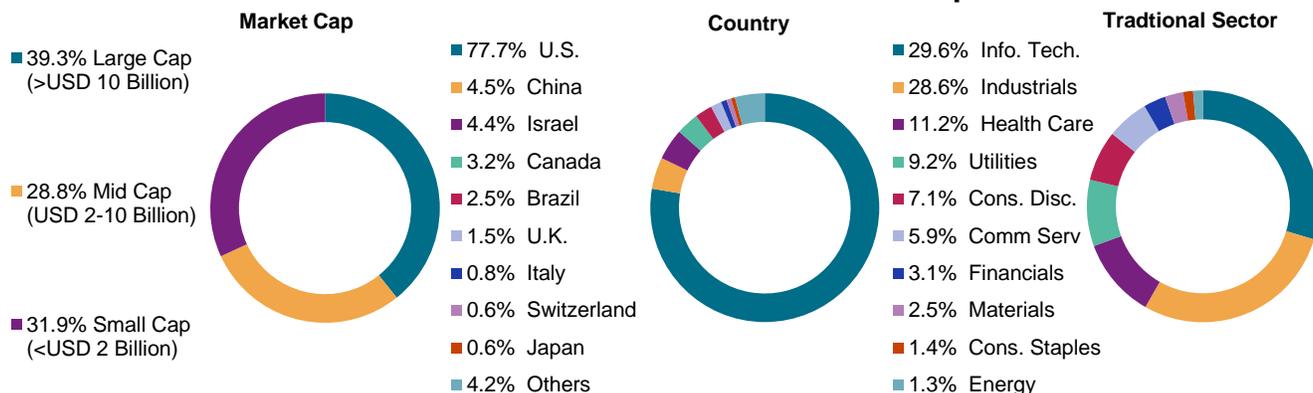
The [S&P Kensho New Economies Composite Index](#) (KNEXP) is made up of all qualifying New Economy subsectors, the industries driving the Fourth Industrial Revolution, with each weighted according to an algorithmic proxy for industry maturity.

### Exhibit 3: Relative Performance of the S&P Kensho New Economies Composite Index



Source: S&P Dow Jones Indices LLC, FactSet. Data from Jan. 2, 2014, to June 30, 2022. Index performance based on price return in USD. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

### Exhibit 4: Breakdown of the S&P Kensho New Economies Composite Index



Source: S&P Dow Jones Indices LLC. Data as of June 30, 2022. Charts are provided for illustrative purposes.

### Exhibit 5: Style, Fundamentals and Differentiation



Source: S&P Dow Jones Indices LLC, FactSet. Data as of June 30, 2022. Past performance is no guarantee of future results. Chart and tables are provided for illustrative purposes.

## Performance Disclosure/Back-Tested Data

The S&P Kensho New Economies Composite Index was launched February 6, 2017. The S&P Kensho Digital Health Index was launched June 21, 2021. The S&P Kensho Smart Factories Index and S&P Kensho Advanced Manufacturing Index were launched September 16, 2021. 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.spglobal.com/spdji](http://www.spglobal.com/spdji). 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).

## General Disclaimer

© 2022 S&P Dow Jones Indices. All rights reserved. S&P, S&P 500, SPX, SPY, The 500, US500, US 30, S&P 100, S&P COMPOSITE 1500, S&P 400, S&P MIDCAP 400, S&P 600, S&P SMALLCAP 600, S&P GIVI, GLOBAL TITANS, DIVIDEND ARISTOCRATS, Select Sector, S&P MAESTRO, S&P PRISM, S&P STRIDE, GICS, SPIVA, SPDR, INDEXOLOGY, iTraxx, iBoxx, ABX, ADBI, CDX, CMBX, LCDX, MBX, MCDX, PRIMEX, TABX, HHPI, IRXX, I-SYND, SOVX, CRITS, CRITR are registered trademarks of S&P Global, Inc. ("S&P Global") or its affiliates. DOW JONES, DJIA, THE DOW and DOW JONES INDUSTRIAL AVERAGE are 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 Global, 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. S&P Dow Jones Indices is not an investment adviser, commodity trading advisor, commodity pool operator, broker dealer, fiduciary, promoter" (as defined in the Investment Company Act of 1940, as amended), "expert" as enumerated within 15 U.S.C. § 77k(a) or tax advisor. Inclusion of a security, commodity, crypto currency or other asset within an index is not a recommendation by S&P Dow Jones Indices to buy, sell, or hold such security, commodity, crypto currency or other asset, nor is it considered to be investment advice or commodity trading advice.

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.

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.