



State Street Mediastats, PriceStats, GeoQuant and Market Risk Indicators Product Descriptions

June, 2023

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State Street Mediastats, PriceStats, GeoQuant and Market Risk Indicators

Product Descriptions

IMPORTANT INTRODUCTION

State Street Bank and Trust Company and its affiliates (collectively, “State Street”) offers various sets of proprietary economic indicators to its institutional clients, including, without limitation, asset managers, hedge funds, banks, pension funds, insurance companies, and investment advisers. These indicators include (i) media-based indicators produced via the systematic collection, curation, and transformation of information culled from internet-based media sources and unique, publicly available data sets (the “State Street Mediastats Indicators”), which are produced in collaboration with MKT Mediastats, LLC (“MKT”), a third-party business unaffiliated with State Street, (ii) price-based indicators produced via the systematic collection, curation, and transformation of information culled from international retailer websites (the “State Street PriceStats Indicators”), which are produced in collaboration with Price Stats, LLC (“PriceStats”), another third-party business unaffiliated with State Street, (iii) political risk indicators produced via the systematic collection, curation, and transformation of information culled from internet-based media sources and publicly available data sets (“GeoQuant Indicators”), which are produced by Fitch Solutions, Inc. doing business as GeoQuant, another third-party business unaffiliated with State Street, and (iv) market risk indicators produced by State Street which provide unique measures of correlation shifts, volatility shocks, and risk concentration (the “State Street Market Risk Indicators”). This document is intended describe the State Street Mediastats Indicators, the State Street PriceStats Indicators, the GeoQuant Indicators, and the State Street Market Risk Indicators (collectively, the “State Street Indicators” or the “Indicators”).

To view information about the potential risks and actual or potential conflicts of interest that we have identified with respect to your use of such State Street Indicators, please reference the “Conflict of Interest and Risk Disclosure” hyperlink at the footer of our Insights page.

WHAT ARE THE TYPES OF STATE STREET MEDIASTATS INDICATORS OFFERED BY STATE STREET?

There are various series of State Street Mediastats Indicators, the current categories of which are each described in more detail below. When describing in this document how various indicator scores have historically tended to indicate an asset’s performance, such performance is measured relative to the same class of assets for which the State Street Mediastats Indicator in question is produced (in each case, the “Indicator Universe”). Since each Indicator Universe is limited in this way, it is possible that results for an asset relative to its Indicator Universe may vary from what may result when viewing such asset’s performance relative to a broader set of available data points.

The Media Indicators. The Media Indicators are produced by using a proprietary algorithm that synthesizes information gathered from thousands of online media sources to generate quantitative indicators measuring the intensity of media coverage, the sentiment of coverage, and the disagreement across coverage for individual companies, currencies, and country-specific equity benchmark indices. The Indicator Universe for the Media Indicators consists of the total number of companies, currencies, or country-specific equity benchmark indices (as applicable) for which the applicable State Street Mediastats Indicators are available. Media Indicators are produced in the form of a z-score, a statistically significant measure of standard deviation from the group norm. Most z-scores will fall within a range of 2 to -2, with 0 being neutral, however the most extreme z-scores can exceed either end of this range. More specifically, the three types of Media Indicators are:

- *Intensity:* The Intensity Media Indicator is intended to reflect the relative frequency with which a given

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company, currency, or country-specific equity benchmark, as applicable, is mentioned in the media. Assets with a high z-score close to or above 2 (high intensity) have historically tended to indicate high levels of market hype and have often underperformed relative to the applicable Indicator Universe. Conversely, assets with a low z-score close to or below -2 (low intensity) have historically tended to indicate that those assets are likely overlooked by market participants and have often outperformed relative to the applicable Indicator Universe.

- **Sentiment:** The Sentiment Media Indicator is intended to reflect the degree to which media coverage of a company, currency, or country-specific equity benchmark, as applicable, is positive or negative. Assets with a high z-score close to or above 2 (high sentiment) have historically often outperformed relative to the applicable Indicator Universe, and assets with a low z-score close to or below -2 (low sentiment) have historically often underperformed relative to the applicable Indicator Universe.
- **Disagreement:** The Disagreement Media Indicator is intended to reflect the variance in sentiment across media coverage of a company, currency, or country-specific equity benchmark, as applicable. Assets with z-scores close to or above 2 (high disagreement) have historically often outperformed relative to the applicable Indicator Universe, and assets with a low z-score close to or below -2 (low disagreement) have historically often underperformed relative to the applicable Indicator Universe.

As of the date of this document, State Street offers separate Intensity, Sentiment and Disagreement Media Indicators for approximately 3,000 individual companies, 11 sectors, 34 currencies, and 44 country-specific equity benchmark indices, which collectively comprise the respective separate Indicator Universes for the companies, currencies, and country-specific equity benchmark indices for which the Media Indicators are produced.

The Hard Content Ratio (HCR) Indicators. The HCR indicators use the same corpus of media articles as the existing company-level media indicators and represent:

- HCR: assesses the degree of factual coverage on a given company. The units of HCR are percentage points (between 0 and 100%). Our research indicates that HCR is negatively correlated with asset prices, thus assets with a higher ratio closer to 100% (high degree of hard content) have historically often underperformed relative to the applicable Indicator Universe, and assets with a lower ratio closer to 0 (low degree of hard content) have historically often outperformed relative to the applicable Indicator Universe.
- HCR Dispersion: assesses the deviation in factual coverage among all articles covering a given company. Assets with a higher score (high HCR dispersion) have historically often outperformed relative to the applicable Indicator Universe, and assets with a lower score (low HCR dispersion) have historically often underperformed relative to the applicable Indicator Universe.

As of the date of this document, State Street offers HCR Indicators for approximately 3,000 individual companies, which comprise the Indicator Universe for the HCR Indicators.

The Social Indicators. The social indicators are designed to capture the tone and intensity of social media covering individual US companies derived from posts and comments on the Reddit social platform. Reddit is a social network platform that is organized in chat rooms by topics of interest. MKT MediaStats collects data and monitors Reddit communication in chat rooms dedicated to the financial markets and trading. As with the Media Indicators, the Social Indicators are produced for approx. 3,000 individual US companies. Companies which attract high social activity, but at the time of inclusion are not part of the Universe, will be added to the data set as needed. Once a company is added to the universe, it remains in the universe indefinitely or until it is no longer traded.

While most natural language processing (NLP) analytics are derived from dictionary-based bags of words, understanding sentiment and intention on some social-media platforms, such as Reddit, requires a different set of tools. Communication on such platforms is often abbreviated, short and direct, and may include offensive language and emojis. Accordingly, our indicator construction process considers social-specific communication features such as emojis.

Information Classification: General

The suite includes two sets of indicators each based on distinct formation cutoff times:

1. Close-to-Close -- the set from which indicators are derived includes social media items generated and time-stamped between two consecutive stock market closings. The Start Date for indicator construction corresponds to the first market close, while the End Date corresponds to the consecutive market close.

For example, the record of indicators based on social media content generated between market close on January 19, 2022 (4pm ET) and the next market close on January 20, 2022 (4pm ET) which are expected to be delivered between 6:30am - 8am on January 21, 2022, has a Start Date of "2022-01-19" and an End Date of "2022-01-20".

2. Open-to-PreOpen -- the set from which indicators are derived includes social media items generated and time-stamped between a stock market opening (typically 9:30 ET) to the pre-opening on the next trading day. Pre-Open is set to 6:30 am ET and includes overnight data, allowing sufficient time for the indicator files to be processed and delivered by 8am ET. Start Date values correspond to the first market opening, while the End Date corresponds to 6:30 am, 3 hours prior to the next market opening.

For example, the record of indicator values based on social media content generated between market-open on January 20, 2022 (9:30 am ET) and the next market pre-open on January 21, 2022 (6am ET) which are expected to be delivered by 8am on January 21, 2022, will have a Start Date of "2022-01-20" and an End Date of "2022-01-21".

In total, over 20 metrics are produced on a daily basis for each company for each cutoff period. Each metric is further available both in "raw" form, which is unadjusted for historical behavior, and also "adjusted" form, which is expressed relative to historical norms. Examples include metrics similar to the Media Indicators such as Intensity and Sentiment, but also include more granular metrics like the Intensity of "Squeeze" commentary or the Intensity of "Rocket" Emojis.

The Central Bank Indicators. The Central Bank Indicators use the same corpus of media articles as the existing macro (currencies, country-specific equity) media indicators. The Central Bank Indicators capture the relative proportion of hawkish and dovish media articles covering central banks. Relevant articles covering each central bank are given a binary score of hawkish or dovish using NLP algorithms to determine aggregate tone (as it relates to monetary policy) of words and phrases used in the article. Final scores are then computed across all articles for a particular central bank and discrete metrics representing various ratios among hawkish, dovish, and total articles for such central bank are reported.

Our analysis suggests that more hawkish (dovish) coverage of central banks tends to be historically correlated with future increases (reductions) in interest rates for a particular country. Additionally, we observe an historical overreaction effect in foreign exchange, whereby the local currency tends to strengthen (weaken) initially coincident with hawkish (dovish) coverage. This overreaction effect tends to revert over the following weeks.

As of the date of this document, State Street offers the Central Bank Indicators for 12 central banks.

Thematic Indicators. The Thematic Indicators leverage the same pool of media articles as existing media indicators. Thematic indicators capture the intensity and sentiment of aggregate media coverage regarding a specific theme or narrative. Themes are decided on by our team of macro-strategists and researchers. Some are timeless in their relevance while others are more topical and short-term in nature.

We produce two types of indicators for each theme, (1) intensity and (2) negative intensity. Intensity is a measure of how much media coverage a specific theme or narrative is getting by counting the number of articles covering a theme relative to the total number of articles collected across all themes. Negative intensity provides a view into how much *negative* coverage a theme is getting by counting the number of articles expressing negative sentiment relative to total number of articles collected across all themes.

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Our initial analysis shows that our measure of thematic intensity can be used to determine what narratives are linked to market movements in the S&P500.

As of the date of this document, State Street offers intensity and negative intensity measures for 78 themes.

You should contact your client service representatives with respect to any questions you have regarding the nature of the State Street Mediastats Indicators, the methodology pursuant to which they are calculated or otherwise.

Thematic Exposures. The State Street Mediastats Thematic Exposures are designed to estimate the exposure of companies, industries/sectors, or currencies (collectively, “assets”) to the media coverage of the themes in our suite of Thematic Indicators. These estimates are generated from a regression of asset-level returns on changes in the intensity of negative coverage in the news of a particular theme. For each asset for each theme, on each day, we report the beta and t-stat from this regression, with each theme/asset combination being run as an individual regression which controls for asset beta to a market factor.

Narrative Map. The State Street Mediastats Narrative Map is designed to determine the set of themes that are relevant to market participants. The Narrative Map is derived from the State Street Mediastats Thematic indicators and covers the same set of themes as the thematic suite, but also incorporates prominent index-level market returns for the narrative map calculations. For understanding equity importance we use the S&P 500 Index (SP500), and for understanding FX importance we use the US Dollar Index (DXY).

The Narrative Map Indicators are outlined below, with each indicator is available for different computational variants based on the parameters used for the model.

Intensity: This is the standard intensity measure taken from the thematic indicators.

R-Squared: This indicator reports the R-squared value from a regression that regresses market returns (SP500 or DXY) on the changes in negative intensity for a particular theme. The value is smoothed over 7 calendar days.

Beta: This indicator reports the beta coefficient from a regression that regresses market returns (SP500 or DXY) on the changes in negative intensity for a particular theme. This value is smoothed over 7 calendar days.

Quadrant: This indicator reports the quadrant classification for each theme, which is based on the combination of the Intensity and R-squared values.

The regression-related outputs (R-squared, Beta and Quadrant) are reported for different regression parameterizations, called model-term:

- Short Daily: Daily observations with a 6-week lookback
- Medium Weekly: Weekly observations with a 13-week lookback
- Long Weekly: Weekly observations with a 26-week lookback

The Linkages Indicators. The Linkages Indicators, which are based on the same underlying data as the Media Indicators, are produced for approximately 500 U.S. large cap companies, 11 sectors and industry classifications, 34 currencies, and 44 country-specific equity benchmark indices as of the date of this document, which collectively comprise the respective separate Indicator Universes for the companies, currencies, and country-specific equity benchmark indices for which the Linkages Indicators are produced as of the date of this document. They are quantitative indicators produced with a focus on relationships amongst assets that are co-mentioned with one another in media sources. Each individual asset included as part of the Linkages Indicators (such subject asset

Information Classification: General

being referred to herein as the “centroid asset” of the applicable indicator) has its own unique “network” (which network, for purposes of the applicable centroid asset, consists of those other companies/sectors/foreign currencies/countries that are co-mentioned with the centroid asset in media sources on the day covered by such centroid asset’s respective indicators).

The Linkages Indicators reflect the relative weights based on the co-mentions of a centroid asset relative to other co-mentioned assets within the centroid asset’s network. Recipients of the Linkages Indicators will be provided the relative weight of every relevant co-mentioned asset for each centroid asset, indicating the relative strength of the reference. These measures quantify the strength of inter-asset relationships to help investors identify potentially undetected links between firms, foreign currencies or countries as they form through co-mentions in the media.

For the universe of 500 U.S. large cap companies only, the Linkages Indicators also reflect the network’s aggregate Intensity, Sentiment, and Disagreement z-scores, which represent the weighted average Sentiment, Intensity, and Disagreement of a centroid company’s network. Recipients of the Linkages Indicators will also be provided, for each centroid asset, z-scores intended to reflect its network’s Intensity, Sentiment and Disagreement. A z-score close to or above 2 has historically often suggested a centroid company’s network is high-Intensity/high-Sentiment/high-Disagreement relative to the Linkages Indicator Universe, while a z-score close to or below -2 has historically often suggested a centroid company’s network is low-Intensity/low-Sentiment/low-Disagreement relative to the Linkages Indicator Universe.

The Earnings Prediction Technology (EPTech) Indicators. The EPTech Indicators are designed to identify the potential of earnings surprises for select U.S. companies through a formulaic approach analyzing large, unstructured data sets from retail websites and mobile apps. Such data sets are compiled using a proprietary blend of data licensed from various third-party providers, together with data generated directly by MKT using web-scraping technology. The EPTech Indicators are produced on a monthly basis. Mentions of a company’s “rate of change” in the descriptions below in each case refer to the rate of change of each EPTech Indicator component (e.g., foot traffic, web traffic, and/or brand awareness, as applicable) over the previous quarter, and not such company’s change in market value. There are three sets of measures included as part of the EPTech Indicators:

- EPTech (2nd Gen.) Component Indicators gauge quarterly changes in potential consumption of a company’s products and/or services broken down by data source type (more specifically, foot traffic, web traffic, and/or brand awareness) for an Indicator Universe of approximately 340 companies for EP Tech (2nd Gen.) Indicators (as of the date of this document). Not every such company will necessarily have all three component indicators (for example, an online-only retailer would not have relevant foot traffic data available). Indicator values for a particular company represent quarter-over-quarter rates of change for each company. Rates of change for both foot traffic and web traffic can be measured more directly due to their quantitative nature, while rates of change for brand awareness are measured indirectly by assigning a normalized numerical value to a company’s mentions and overall sentiment across various media sources using a proprietary systematic approach. Companies with a higher rate of change have historically tended to indicate that consumption has grown faster for those retailing companies and they have tended to outperform relative to the EPTech (2nd Gen.) Indicator Universe. Conversely, companies with a lower or negative rate of change have historically tended to indicate that consumption has lagged for those retailing companies and they have tended to underperform relative to the EPTech (2nd Gen.) Indicator Universe.
- Aggregate EPTech (2nd Gen.) Indicators combine all available component series for each company in the EPTech (2nd Gen.) Indicator Universe using a proprietary approach, and then rank each company relative to the EPTech (2nd Gen.) Indicator Universe. A quantitative z-score is assigned to each company, which, based on historical analysis of this quantitative measure, may suggest the likelihood of the company to outperform (as reflected by z-scores close to or higher than 2) or underperform (as reflected by z-scores close to or lower than -2) relative to the EPTech (2nd Gen.) Indicator Universe.
- EPTech (1st Gen.) Indicators weigh only the foot traffic component series for approximately 70 companies for EP Tech (1st Gen.) Indicators (as of the date of this document) using a proprietary approach, and then rank each company relative to the entire EPTech (1st Gen.) Indicator Universe. A quantitative quintile of 1 through 5 score is assigned to each company, which, based on historical analysis of this quantitative

measure, may suggest the likelihood of the company to outperform relative to the EPTech (1st Gen.) Indicator Universe (as reflected by a quintile score closer to 5) or underperform relative to the EPTech (1st Gen.) Indicator Universe (as reflected by a quintile score closer to 1).

You should contact your client service representatives with respect to any questions you have regarding the nature of the State Street Indicators, the methodology pursuant to which they are calculated or otherwise.

WHAT ARE THE TYPES OF STATE STREET PRICESTATS INDICATORS OFFERED BY STATE STREET?

There are currently two distinct series of State Street PriceStats Indicators: the Country Inflation Indicators and the Purchasing Power Parity (PPP) Indicators. Each of these series is described in greater detail below. For each indicator set we also define the Indicator Universe of the applicable State Street PriceStats Indicators, which comprises the current set of countries/sectors/regions/etc. for which each State Street PriceStats Indicator is currently available.

The Country Inflation Indicators. The Country Inflation Indicators are produced by using a proprietary algorithm that synthesizes information gathered from thousands of retailer websites to generate quantitative indicators that measure the daily change in price for millions of goods around the globe. The Indicator Universe for the Country Inflation Indicators consists of the total number of country aggregate or sector-specific indices for which the applicable State Street PriceStats Indicators are available. Country Inflation Indicators are produced in the form of a Price Index, a Monthly Inflation Series, and an Annual Inflation Series. The definition of each of these is as follows:

- *Price Index:* The Price Index is constructed as an average of individual price changes across multiple categories and retailers in a particular country. The index uses a basket of goods that changes over time as products appear and disappear from a retailer's webpage. It is updated on a daily basis and leveraged to estimate annual and monthly inflation. This index is not designed to forecast official inflation announcements but rather to provide real-time information on major inflation trends.
- *Monthly Inflation Series:* The monthly country inflation rate is the percentage change between the average of the daily price index series over the most-recent 30 days and the average of the 30 days preceding the most-recent 30 days. For example, on the last day of September, we compared the average of the daily index between September 1 and September 30 to the average of the daily index between August 2 and August 31. On the last day of each month, the value of our monthly inflation series is equivalent to the monthly statistic reported by official offices. For countries that publish their official estimate of inflation on a quarterly basis, such as Australia and New Zealand, we instead compute a quarterly inflation series based on the change in the 30-day average on a quarter-on-quarter basis.
- *Annual Inflation Series:* The annual country inflation rate is the percentage change between the average of the daily price index series of the last 30 days and the average for the same period during the prior year. For example, on the last day of September 2021, we compare the average of the daily index between September 1 and September 30, 2021 to the average of the daily index between September 1 and September 30, 2020. On the last day of each month, the value of our annual inflation series is equivalent to the annual (year-to-year) statistic reported by official offices.

As of the date of this document, State Street offers Price Index, Monthly, Quarterly, and Annual Indicators for 25 countries and 6 distinct sectors for the United States. Additionally, State Street offers regional aggregates for All items, Food items, and Fuel, which are available for Developed Markets, Emerging Markets, and World. Additionally, State Street offers a Diffusion Index, which tracks the number of countries where inflation is increasing vs. the number where inflation is decreasing. Collectively these indicators comprise the Indicator Universe for the Country Inflation Indicators. For further information on the Country Inflation Indicators, please see <https://globalmarkets.statestr.com/research/myportal/insights-help-center/indicators/priceStats/introduction/>

The Purchasing Power Parity (PPP) Indicators. Based on the same underlying data as the Country Inflation

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Indicators, the Purchasing Power Parity Indicators compare relative price levels between two countries using a basket of precisely-matched goods. Using online prices, PriceStats computes the relative cost of a basket of identical goods in two specified countries and signals Real Exchange Rate (RER) deviations from PPP or RER historical averages. Currently, all calculations use either the U.S. or Germany as the base country to which other countries are compared. Base countries may be expanded in future releases of the PPP Indicators. The PPP Indicators' measures of RERs have two primary advantages: (a) They use a common basket of ~250 goods matched across countries including food, electronics and fuel (most RER views are single-item based or use price indices that are based on different baskets), and (b) They are high-frequency (daily values) and updated on a monthly basis (other RERs are updated from six months to five years apart). There are six distinct series types for the PPP Indicators:

- *Relative Price Series*: This series shows the relative price level of the measured basket of goods between Country A and Country B, where price levels are left in local currency. This calculation uses the common basket of ~250 goods outlined above, and forms the basis for the remaining series.
- *Real Exchange Rate Series*: This series takes the relative price levels and converts each to a comparable currency using market exchange rates, which provides a measure of the true cost of a basket of identical goods for the two countries.
- *Valuation Series (PPP Benchmark)*: This series expresses the RER over/undervaluation in % against PPP, where PPP assumes that RER should equal 1.
- *Valuation Series (Historical Benchmark)*: This series expresses the RER over/undervaluation in % against an historical average of the computed RER values.
- *Implied Nominal Exchange Rate Series (PPP Benchmark)*: This series shows the nominal exchange rate that would hold under the assumption that the purchasing power in two countries should be equivalent.
- *Implied Nominal Exchange Rate Series (Historical Benchmark)*: This series shows the nominal exchange rate that would hold under the historical average of RER values.

As of the date of this document, State Street offers PPP Indicators for 15 country pairs which comprise the Indicator Universe for PPP Indicators.

WHAT ARE THE TYPES OF GEOQUANT INDICATORS OFFERED BY STATE STREET?

The GeoQuant Indicators are a set of political risk indicators developed by GeoQuant using the latest advances in political and computer science. In contrast to pundit-driven political risk metrics, GeoQuant takes a much more data-centric approach, using a combination of slower-moving fundamental data and higher-frequency news coverage to evaluate the core drivers of political change in a country and develop a political risk score comparable across time and across countries. The fundamental data used to develop the indicators is sourced from government official statistical offices and international organizations, and the news coverage is sourced from thousands of online news media sources.

State Street has full access to GeoQuant Inc. indicators and research insights (together "GeoQuant Indicators") pursuant to an annual subscription agreement. GeoQuant Inc., provides GeoQuant Indicators to State Street for mutually agreed uses only, including the State Street Insights Platform and Markets Research publications. State Street selects a subset of GeoQuant Indicators to include in its Insights Platform and Markets Research publications based on perceived relevancy to clients. State Street does not provide the full suite of GeoQuant Indicators to clients. Clients seeking full access to GeoQuant Indicators must subscribe directly to GeoQuant Inc. for this information. State Street may be entitled to receive a share of revenues related to client subscriptions generated from State Street clients.

Information Classification: General

WHAT ARE THE TYPES OF STATE STREET MARKET RISK INDICATORS OFFERED BY STATE STREET?

The State Street Market Risk Indicators provide unique measures of correlation shifts, volatility shocks, and risk concentration that can help indicate the likelihood of drawdowns in risk assets. Taken together, these measures help enable institutional investors to implement downside protection or hedging strategies, time exposure to a wide range of risk premia and tactical asset allocation decisions, and stress test portfolios and investment strategies for robustness to risk regimes.

The State Street Market Risk Indicators are supported by research generated in connection with State Street's academic partnerships. State Street's risk indicators span multi-asset, equity, fixed income, and currency markets globally and include the following measures of market risk:

- **Turbulence Indicator:** Turbulence is designed to be a price-based measure of the joint unusualness of returns across a group of asset classes or market segments within an asset class or region. It aims to capture spikes in volatility in individual market components as well as correlation breakdowns – atypical co-movements – between these components. Periods of high statistical turbulence have historically coincided with well-known events in financial history and have shown to be highly persistent, and risk premia have historically tended to underperform during times of turbulence.
- **Systemic Risk Indicator:** These indicators are designed to measure systemic risk through a statistical measure of the collective similarity of equity price returns across the market. A high absorption ratio implies that markets are compact or tightly coupled. Compact markets have historically shown to be relatively fragile in that shocks typically propagate more quickly and broadly through the financial system than when markets are loosely linked.
- **Tail Risk Score:** State Street's tail risk framework is designed to provide a unique characterization of the current financial market environment and the potential likelihood of extreme losses (or "tail risk") by mathematically blending the Turbulence Indicator and the Systemic Risk Indicator using a pre-defined formula where the highest values result from times when both measures are high and lower values result from either measure (or both) registering at lower levels.
- **Recession Likelihood Indicator:** The Recession Likelihood Indicator uses the Mahalanobis distance to measure the statistical similarity of current economic conditions to past episodes of recession and robust growth. It gives an objective assessment of the business cycle expressed in units of statistical likelihood.

The Market Froth Indicators. The Market Froth Indicators are designed to capture the degree of "frothiness" in markets. That is, to identify particular country-sectors that have been/are experiencing certain events that tend to be associated with significant overvaluation and the potential for large future drawdown event. Examples of the characteristics used to determine frothiness/susceptibility:

- Extreme price runups
- Increased volatility
- Large number of companies issuing stock
- Consistent reaching of cycle-high prices
- Extreme Flows and Holdings
- An increase in overall market risk aversion

These characteristics are used to create an estimate for the drawdown potential over the next 1-2 years, as well as the probability of a "large" drawdown – where large is set to be a drawdown of 40% or larger.

The indicator is built from regression-based analysis. For each country sector we gather the relevant metrics from market data sources and transform them to capture the particular factor of interest. E.g. for the “Large Number of Companies Issuing Stock” we compute the % companies in country-sector that have issuance greater than 5% over previous 2 years.

We also include a subset of our Investor Behavior Indicators as inputs. For most countries, however, we do not produce Investor Behavior metrics down to the granularity of the country-sector level. As such, we instead use higher-level behavioral indicators, specifically Global Sector Flows and Country Holdings, and replicate those values across all sectors or countries. In doing this we are making the implicit assumption that those sector or country trends are consistent within the more granular market segments.

Once the data is gathered we run a panel regression of forward-looking drawdowns on the full set of factors. From this regression we report the current values for the estimated future drawdown (or probability of a large drawdown) as well as the contribution of each factor to that estimate.

HOW AND ON WHAT FREQUENCY WILL STATE STREET PROVIDE THE STATE STREET INDICATORS?

State Street Mediastats Indicators. The Media Indicators, which include the HCR Indicators, Central Bank Indicators, and Thematic Indicators described above, are published and made available to all subscribers on a daily basis for (as relevant) all covered companies, currencies, Themes, Central Banks and country-specific benchmark equity indices with a one (1) business-day lag. The Linkages Indicators are published and made available to all subscribers on a daily basis for all covered companies. The EPTech Indicators are published and made available to all subscribers on a monthly basis approximately ten (10) business days after the beginning of each month.

State Street PriceStats Indicators. The Country Inflation Indicators are published and made available to all subscribers on a daily basis for all covered countries and sectors with a three (3) business-day lag. The PPP Indicators contain daily values, but are published and made available to all subscribers on a monthly basis approximately three (3) business days after the beginning of each month. For instance, on June 1, 2021 we simultaneously published values for every day in May 2021.

GeoQuant Indicators. The GeoQuant Indicators are published and made available to all subscribers on a daily basis for all covered countries with a (1) business-day publication lag.

State Street Market Risk Indicators. The State Street Market Risk Indicators are published and made available to all subscribers on a daily basis for all covered countries and market segments with a one (1) business-day publication lag.

The frequency of publication and method of delivery of all of the State Street Indicators is subject to change at any time and from time to time by State Street, subject to your specific contractual arrangements. The State Street Indicators are made available to subscribers for download via a website made known to you, which address may be updated from time to time upon advance notice. Furthermore, subject to your specific contractual arrangements, State Street may also offer complimentary access to State Street Indicators in the form of charts and tables on our website, as well as select publications, based on the State Street Indicators.

State Street does not undertake, and is under no obligation to, update, modify or amend any previously published State Street Indicators or to otherwise notify a subscriber thereof if any ranking, score or linkage changes subsequently becomes inaccurate.

Each of the State Street Indicators described in this document is published and made available to all subscribers simultaneously, with no individual subscribers (including affiliates of State Street) being entitled to early or preferential access.

Information Classification: General

