

S&P Dow Jones Indices

A Division of **S&P Global**

S&P/B3 Indices *Methodology*

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Introduction

Index Objectives, Highlights, and Index Family

S&P/B3 High Beta Index. The index measures the performance of Brazilian stocks that are most sensitive to changes in market returns. Sensitivity is measured by the beta of each individual stock. Beta is calculated as the slope of the regression line of the security's trailing past-year (12 months) returns, using daily price returns versus the daily price returns of the S&P Brazil BMI over the same period, both measured in Brazilian reais. Constituents are assigned index weights proportional to their beta, subject to a 10% cap.

S&P/B3 Non-State Owned Enterprises Index. The index measures the performance of stocks listed on the B3 (Brazilian stock exchange) that are not controlled, directly or indirectly, by public entities such as labor unions, states, the Federal District, or municipalities. To identify non-state-owned stocks S&P Dow Jones Indices ('S&P DJI') uses companies' self-reported data, as provided to the Securities and Exchange Commission of Brazil (Comissão de Valores Mobiliários, CVM), in accordance with CVM Instruction 480.¹ Constituents are float-adjusted market capitalization (FMC) weighted, subject to a company weight cap of 10%.

S&P/B3 Enhanced Value Index. The index measures the performance of stocks in the Brazilian equity market that are highly ranked on the basis of their value score, which is calculated based on three fundamental measures: book value-to-price, earnings-to-price, and sales-to-price (see *Appendix A*). Constituents are weighted by the product of their market capitalization in the index universe and the value score, subject to a maximum GICS sector weight of 40% and a maximum single stock weight of 10%. Each stock's weight is floored at 0.05%.

S&P/B3 Inverse-Risk Weighted Index. The index measures the inverse-volatility-weighted performance of stocks in the Brazilian equity market. Volatility is defined as the standard deviation of the security's daily price returns in local currency over the prior one year of trading days (see *Appendix B*). Constituents are weighted relative to the inverse of their corresponding volatility, with the least volatile stocks receiving the highest weights.

S&P/B3 Low Volatility Index. The index measures the performance of the least volatile 25% of stocks within the Brazilian equity market. Volatility is defined as the standard deviation of the security's daily price returns in local currency over the prior one year of trading days (see *Appendix B*). Constituents are weighted relative to the inverse of their corresponding volatility, with the least volatile stocks receiving the highest weights and subject to a single stock weight cap of 10%.

S&P/B3 Momentum Index. The index measures the performance of stocks in the Brazilian equity market that were among the quartile demonstrating the best-realized performance during the specified measurement period. Constituents are weighted by the product of their market capitalization in the index universe and their momentum score (see *Appendix C*), subject to security constraints. The maximum weight of each security is the lesser of 9% and three times its market capitalization weight in the index.

¹ For information on CVM Instruction 480, please reference the following link:
http://www.cvm.gov.br/export/sites/cvm/subportal_inqles/menu/investors/anexos/CVM-Instruction-480.pdf.

S&P/B3 Quality Index. The index measures the performance of stocks in the Brazilian equity market that are highly ranked on the basis of their quality score, which is calculated based on three fundamental measures: return on equity, accruals ratio and financial leverage ratio (see *Appendix D*). Constituents are weighted by their quality score multiplied by their market capitalization, subject to a maximum GICS sector weight of 40% and a maximum single stock weight of 10%. Each stock's weight is floored at 0.05%.

S&P/B3 Low Volatility High Dividend Index. The index measures the performance of the least volatile stocks among a specified group of high dividend-yielding constituents, subject to diversification and tradability requirements. Index constituents are weighted by trailing 12-month dividend yield, subject to the maximum weight of each security being the lower of 15% and five times its liquidity weight. Liquidity is based on the security's six-month median daily value traded (MDVT).

S&P/B3 SmallCap Select Index. The index measures the performance of small cap securities with positive earnings listed on the B3. Constituents are FMC weighted.

S&P/B3 Brazil ESG Index. The index is an S&P DJI ESG score-weighted, broad-based index that measures the performance of securities meeting the sustainability criteria defined in *Eligibility Criteria*. The index applies exclusions based on companies' involvement in specific business activities, performance against the principles of the United Nations' Global Compact (UNGC), involvement in relevant ESG controversies, and companies with no S&P DJI ESG Score. Except for the S&P/B3 Ingenius Index, the S&P/B3 Indices are constructed from the constituents of the S&P Brazil BMI that are actively traded on the B3. The S&P Brazil BMI is a subset of the S&P Global BMI.

For more information on the eligibility criteria and index construction for the S&P Brazil BMI, please refer to the S&P Global BMI/S&P IFCI Index Methodology document located on our Web site, www.spdji.com.

S&P/B3 Ingenius Index. The index measures the performance of large technology and tech-enabled companies with high S&P Growth Scores and listings on the NYSE, Nasdaq, and the B3 as Brazilian Depositary Receipts (BDRs). Index constituents are weighted by S&P Momentum Score, subject to a 20% single stock cap. Stocks in the index are represented by their respective BDR.

Supporting Documents

This methodology is meant to be read in conjunction with supporting documents providing greater detail with respect to the policies, procedures and calculations described herein. References throughout the methodology direct the reader to the relevant supporting document for further information on a specific topic. The list of the main supplemental documents for this methodology and the hyperlinks to those documents is as follows:

Supporting Document	URL
S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology	Equity Indices Policies & Practices
S&P Dow Jones Indices' Index Mathematics Methodology	Index Mathematics Methodology
S&P Dow Jones Indices' Float Adjustment Methodology	Float Adjustment Methodology
S&P Dow Jones Indices' Global Industry Classification Standard (GICS) Methodology	GICS Methodology
S&P DJI ESG Score Methodology	S&P DJI ESG Score Methodology

This methodology was created by S&P Dow Jones Indices in agreement with B3² to achieve the aforementioned objective of measuring the underlying interest of each index governed by this methodology document. Any changes to or deviations from this methodology are made in the sole judgment and discretion of S&P Dow Jones Indices and B3 so that the index continues to achieve its objective.

² In March 2017 BM&FBOVESPA S.A. Securities, Commodities & Futures Exchange merged with Cetip S.A. Organized Markets. The result was B3.

Eligibility Criteria

Index Universe

Except for the S&P/B3 Ingenius Index, for a security to be eligible for consideration for the S&P/B3 Indices, it must, on the rebalancing reference date:

- Be actively trading on the B3 as a local listing;
- Be an existing member of the S&P Brazil BMI.

The index universe excludes issues designated to be under exceptional trading status, which means shares, or units representing shares, of issuers under judicial or extrajudicial reorganization, government- or court-ordered administration or intervention, as well as shares otherwise so designated pursuant to B3 rules.

Current constituent stocks that trade under exceptional status become ineligible for index inclusion membership. If S&P Dow Jones Indices determines an index constituent has started trading under exceptional trading status, it will be removed from the index as soon as practicable once it is confirmed and with advance notice. A stock that falls under the exceptional trading status will not be eligible for index inclusion until 12 months after the exceptional trading status is lifted.

Except for the S&P/B3 Ingenius Index, Brazilian Depository Receipts (BDRs), are not eligible for index consideration.

In addition to the above, certain indices incorporate additional eligibility factors, listed below by index.

S&P/B3 Ingenius Index

Index Universe. The index universe consists of all B3-listed BDRs related to constituents of the S&P Global BMI Growth, adjusted for any composition changes due to the current rebalancing, that trade on the NYSE and Nasdaq.

Eligibility Factors. All stocks in the Index Universe that satisfy the following criteria, as of the rebalancing reference date, are selected and form the eligible universe:

- **Growth Score.** Stocks' growth score from the S&P Global BMI Growth must be greater than or equal to 0.6.
For information on Growth Score calculation, please refer to the S&P Global BMI, S&P/IFCI Methodology.
- **FMC.** Stocks must have an FMC greater than or equal to USD \$50 billion.

- **GICS Classification.** Stocks must be classified as one of the following sub-industries.³

Sector	Sub-Industry	Code
Communication Services	Interactive Media & Services	50203010
	Movies & Entertainment	50202010
Consumer Discretionary	Internet & Direct Marketing Retail	25502020
Information Technology	Systems Software	45103020
	Technology Hardware Storage & Peripherals	45202030
	Data Processing & Outsourced Services	45102020
	Semiconductors	45301020

Multiple Share Classes. Each company is represented once by the most liquid share class line based on six-month average daily value traded (“ADVT”) as of the rebalancing reference date. The share class line included in the index may be changed if the six-month ADVT of the non-index share class line is twice as much as the included one.

S&P/B3 Non-State Owned Enterprises Index

Stocks must, as of the rebalancing reference date:

- Have been listed for a minimum of three months and traded at least 95% of the days the exchange was in operation during the minimum three-month listing period.
- Have a minimum three-month MDVT of BRL 10 million (BRL 7 million for current constituents).
- Have a minimum FMC of BRL 1 billion (BRL 700 million for current constituents).
- Have a minimum IWF of 0.05.
- Not be a state-owned enterprise as self-reported to the Securities and Exchange Commission of Brazil (Comissão de Valores Mobiliários, CVM), in accordance with CVM Instruction 480.⁴

S&P/B3 High Beta⁵, Inverse-Risk Weighted, Enhanced Value, Quality, Momentum, Low Volatility, and Low Volatility High Dividend Indices⁶

Stocks must, as of the rebalancing reference date:

- Have a minimum six-month MDVT of BRL 5 million (BRL 4 million for current constituents).
- Have a minimum median value traded ratio (MVTR) of 2% for each of the prior 12 months (1.5% for current constituents). The MVTR of each stock is defined as follows:
 - The monthly value traded ratio is calculated for each of the prior 12 months, by taking the monthly MDVT divided by its respective end of month FMC, where each month’s value traded ratio must be at least 2% for non-constituents and 1.5% for current constituents.
 - Companies with less than 12 months of trading history will be considered for the **S&P/B3 Enhanced Value, Momentum, and Quality Indices** as long as they have a trading history of at least six months and meet all other eligibility criteria. For the **S&P/B3 High Beta, Inverse-Risk Weighted, Low Volatility, and Low Volatility High Dividend Indices**, each stock must have been issued and trading for at least one calendar year before becoming an index constituent.

³ For history prior to September 2018, the eligible GICS sub-industries were mapped with the codes available before the GICS restructuring.

⁴ The list of state-owned companies is provided by B3 on an annual basis as of the last business day in July.

⁵ For back-testing purposes, prior to March 2015 the liquidity requirement was a minimum six-month average daily traded value (ADTV) of BRL 2 million.

⁶ For back-testing purposes, prior to March 2015 the liquidity requirement was a minimum three-month average daily traded value (ADTV) of BRL 2 million.

S&P/B3 SmallCap Select Index

Stocks must, as of the rebalancing reference date, be constituents of the S&P Brazil SmallCap.

For more information on size segmentation of the S&P Global BMI country indices, please refer to the S&P Global BMI, S&P/IFCI Methodology.

S&P/B3 Brazil ESG Index

At each rebalancing reference date the following exclusions are applied to the index universe:

Exclusions Based on Business Activities & UNGC. Companies with the following specific business activities, and companies with disqualifying UNGC scores as determined by Sustainalytics, are excluded from the eligible universe:

Sustainalytics Category of Involvement	Sustainalytics Category of Involvement Description	Sustainalytics Involvement Proxy	S&P DJI Level of Involvement Threshold
Controversial Weapons: Tailor Made and Essential	The company is involved in the core weapon system, or components/services of the core weapon system that are considered tailor-made and essential for the lethal use of the weapon.	NA	>0%
Controversial Weapons: Significant Ownership (Tailor Made and Essential)	The company is involved (as above), through corporate ownership.		≥25% Ownership of Company ⁷
Tobacco: Production	The company manufactures tobacco products.	Revenue	>0%
Tobacco: Related Products/ Services	The company supplies tobacco-related products/services.		≥10%
Tobacco: Retail	The company derives revenues from the distribution and/or retail sale of tobacco products.		≥10%
Tobacco: Significant Ownership (production)	The company owns 10-50 per cent of another company with involvement in manufacturing tobacco products.		≥25%
Tobacco: Significant Ownership (related products/ services)	The company owns 10-50 per cent of another company with involvement in supplying tobacco-related products/services.		≥25%
Tobacco: Significant Ownership (retail)	The company owns 10-50 per cent of another company with involvement in the distribution and/or retail sale of tobacco products.		≥25%
Thermal Coal: Extraction	The company extracts thermal coal.		≥5%
Thermal Coal: Power Generation	The company generates electricity from thermal coal.		≥5%

Exclusions Based on Sustainalytics Global Standards Screening (GSS). Sustainalytics GSS provides an assessment of a company's impact on stakeholders and the extent to which a company causes, contributes, or is linked to violations of international norms and standards. The basis of the GSS' assessments are the UNGC Principles. A company is classified as Non-Compliant, Watchlist, or Compliant according to these principles.

- **Non-Compliant:** Companies that do not act in accordance with UNGC principles and associated standards, conventions, and treaties.
- **Watchlist:** Companies that are at risk of violating one or more principles, for which all dimensions for Non-Compliant status could neither be established nor confirmed.

⁷ Prior to January 2019 Sustainalytics did not collect data on the corporate ownership indicator, so the index history does not reflect the impact of the indicator. From January 2019 forward the indicator is applied, along with the other categories of involvement indicators, at each rebalancing.

- **Compliant:** Companies that act in accordance with UNGC principles and associated standards, conventions, and treaties.

For more information on the GSS please refer to Sustainalytics' GSS Methodology.

As of each rebalancing reference date, non-constituents that are on the Watchlist or are Non-Compliant, according to Sustainalytics, are ineligible for index inclusion. Existing constituents that are on the Watchlist will not be removed from the index unless they become Non-Compliant.

Companies without Sustainalytics coverage are ineligible for index inclusion until they receive such coverage.

For more information on Sustainalytics, including the GSS Methodology, please refer to <https://www.sustainalytics.com/>.

Exclusions Based on ESG Score. Companies with no S&P DJI ESG score are excluded from the index.

Controversies: Media and Stakeholder Analysis Overlay. In addition to the above, companies may be removed from the Index between annual reviews. SAM (part of S&P Global), uses RepRisk, a leading provider of business intelligence on environmental, social, and governance risks, for daily filtering, screening, and analysis of controversies related to companies within the indices.

In cases where risks are presented, SAM releases a Media and Stakeholder Analysis (MSA) which includes a range of issues such as economic crime and corruption, fraud, illegal commercial practices, human rights issues, labor disputes, workplace safety, catastrophic accidents, and environmental disasters.

The Index Committee will review constituents that have been flagged by SAM's MSA to evaluate the potential impact of controversial company activities on the composition of the indices. In the event that the Index Committee decides to remove a company in question, that company would not be eligible for re-entry into the index for one full calendar year, beginning with the subsequent rebalancing.

For more information on RepRisk, please refer to www.reprisk.com. This service is not considered a direct contribution to the index construction process.

Multiple Share Classes

S&P/B3 Non-State Owned Enterprises, S&P/B3 Momentum Indices, and S&P/B3 Brazil SmallCap Select Index. All publicly listed multiple share class lines are eligible for index inclusion, subject to meeting the eligibility criteria. For more information regarding the treatment of multiple share classes, please refer to Approach A within the Multiple Share Classes section of the S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

S&P/B3 High Beta, Inverse-Risk Weighted, Enhanced Value, Quality, and Low Volatility Indices. Each company is represented once by the Designated Listing. For more information regarding the treatment of multiple share classes, please refer to Approach B within the Multiple Share Classes section of the S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

S&P/B3 Low Volatility High Dividend Index. Each company is represented once by the Designated Listing. For more information regarding the treatment of multiple share classes, please refer to Approach C within the Multiple Share Classes section of the S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Dividend Payment Types

S&P/B3 Low Volatility High Dividend Index. S&P Dow Jones Indices only considers cash dividend payments declared as regular by the paying company for index eligibility, selection, and weighting purposes. Cash dividend payments declared as special by the paying company, including recurring special cash dividends, are not considered. For both eligibility and weighting purposes, annualized cash dividend amounts, before withholding tax, are used.

Index Construction

S&P/B3 High Beta Index

Constituent Selection. All stocks in the eligible universe are screened to verify index eligibility as defined in the *Eligibility Criteria* section above.

Using trailing daily price changes over the previous year, the S&P Brazil BMI constituents' betas are calculated. Constituents are then ranked in descending order of their betas, which is the slope of the regression line of the security's trailing past-year (12 months) price returns versus the daily price returns of the S&P Brazil BMI over the same period, both measured in Brazilian reals.

The top 25% securities in the eligible universe form the index, subject to a minimum count of 25⁸ stocks.

Constituent Weightings. At each rebalancing, the weight, w , for each index constituent i is set proportionally to its beta, as follows:

$$w_i = \frac{\text{Beta}_i}{\sum_{i=1}^N \text{Beta}}$$

Minimum Beta. At each rebalancing, the minimum weighted average target beta of the index should be 1.3. The weighted average beta of the index is calculated as $\sum_{i=1}^N w_i \beta_i$.

Additionally, the index employs an individual stock weight cap of 10%. If the target beta of 1.3 is not initially achievable while applying the 10% stock cap, constituents' weights are optimized to reach the target beta and stock caps using the following process.

If $\sum_{k=1}^N w_k * \beta_k < Target$ then:

1. Separate index constituents into two Sets:
 - i. Set A: Constituents whose beta is greater or equal to the target.
 - ii. Set B: Constituents whose beta is below the target.
2. For each stock x_i in Set A, apply a factor a to its original weight w_i to get a new weight, $w'_i = a * w_i$, to achieve the target weighted beta; For each stock x_j in Set B apply a factor b to its original weight w_j to get a new weight, $w'_j = b * w_j$, to achieve the Target weighted beta.

$$a \sum w_i + b \sum w_j = \sum w'_i + \sum w'_j = \sum_{k=1}^N w_k = 1$$

$$\sum w'_i \beta_i + \sum w'_j \beta_j = Target$$

$$a \sum w_i \beta_i + b \sum w_j \beta_j = Target$$

⁸ For history prior to March 2015, the minimum stock count was 20.

where:

$$b = \frac{1 - a \sum w_i}{(1 - \sum w_i)}$$

Solve for a :

$$a = \frac{\text{Target} * (1 - \sum w_i) - \sum w_j * \beta_j}{(\sum w_i * \beta_i) * (1 - \sum w_i) - (\sum w_i) * (\sum w_j * \beta_j)}$$

$$a > 1$$
$$a < \sum w_i$$

If the factor a increases a stock's weight over 10%, a is adjusted for that stock and the excess weight is redistributed across all stocks with beta greater than or equal to target beta.

If the 10% stock cap cannot be satisfied, then the minimum weighted average beta may be reduced by increments of 0.01 until the cap is satisfied.

Please refer to S&P Dow Jones Indices' Index Mathematics Methodology for a detailed description of a modified market capitalization weighted index methodology.

Rebalancing. The index is rebalanced quarterly after the close on the third Friday of March, June, September, and December. The rebalancing reference date is the last business day of February, May, August, and November. Constituents' index shares are calculated using closing prices on the Wednesday prior to the second Friday of the rebalancing month as the reference price. Index share amounts are calculated and assigned to each stock to arrive at the weights determined on the reference date.

S&P/B3 Non-State Owned Enterprises Index

Constituent Selection. All stocks in the eligible universe are screened to verify index eligibility as defined in the *Eligibility Criteria* section above. All stocks that meet all index eligibility criteria are selected and form the index.

Constituent Weightings. At each rebalancing, constituents are weighted by FMC subject to a maximum company weight of 10%.⁹

Please refer to S&P Dow Jones Indices' Index Mathematics Methodology for a detailed description of a capped market capitalization weighted index methodology.

Rebalancing. The index is rebalanced annually after the close on the third Friday of September. In addition, the index is re-weighted after the close of the third Friday of March. The rebalancing reference date for market capitalization and liquidity data is the last business day of August, while the reference date for state-owned company data from B3 is the last business day of July. Constituents' index shares are calculated using closing prices on the Wednesday prior to the second Friday of the rebalancing month as the reference price. Index share amounts are calculated and assigned to each stock to arrive at the weights determined on the reference date.

⁹ For history prior to the September 2014 rebalancing the index capped single stocks at 10% of the index and single companies at 20% of the index.

S&P/B3 Enhanced Value Index

Constituent Selection. The top 25% of securities in the eligible universe, based on value scores, are chosen, subject to a minimum count of 25 stocks. The value score of each stock is derived from its book value-to-price, earnings-to-price and sales-to-price ratios. The value score of each stock is updated semi-annually at the June and December index rebalancings.

Buffer Rule. A 25% buffer is applied to stocks already in the index in order to reduce portfolio turnover and is implemented as follows:

1. Stocks are ranked based on value score and those ranked within the top 20% of the eligible universe stock count are automatically chosen for index inclusion.
2. All stocks which are current constituents that fall within the top 30% of the eligible universe stock count are then chosen for index inclusion in order of their value score.
3. If at this point the minimum stock count or 25% of the stocks in the eligible universe have not been chosen, the remaining stocks are chosen based on their value score.

Constituent Weightings. For a given rebalancing date, all the securities eligible for inclusion in the index are weighted by the product of their market capitalization in the index universe and the value score, subject to a maximum GICS sector weight of 40% and a maximum single stock weight of 10%. Each stock's weight is floored at 0.05%.

Please refer to Appendix A for value score calculation details.

Rebalancing. The index is rebalanced semi-annually after the close on the third Friday of June and December. As part of the rebalancing process, constituent stock weights are updated. The rebalancing reference date is the last business day of May and November, respectively. Constituents' index shares are calculated using closing prices on the Wednesday prior to the second Friday of the rebalancing month as the reference price. Index share amounts are calculated and assigned to each stock to arrive at the weights determined on the reference date.

S&P/B3 Inverse-Risk Weighted Index

Constituent Selection. All securities in the eligible universe are chosen.

Constituent Weightings. At each rebalancing, the weight, w , for each index constituent, i , is set inversely proportional to its volatility.

$$w_i = \frac{\frac{1}{Volatility_i}}{\sum_{i=1}^N \frac{1}{Volatility}}$$

where:

N = The number of constituents at each rebalancing

Please refer to Appendix B for volatility calculation details.

Rebalancing. The index is rebalanced quarterly after the close on the third Friday of March, June, September and December. As part of the rebalancing process, constituent stock weights are updated. The rebalancing reference date is the last business day of February, May, August and November, respectively. Constituents' index shares are calculated using closing prices on the Wednesday prior to the second Friday of the rebalancing month as the reference price. Index share amounts are calculated and assigned to each stock to arrive at the weights determined on the reference date.

S&P/B3 Low Volatility Index

Constituent Selection. The top 25% of securities in the eligible universe, based on count and volatility, are chosen, subject to a minimum count of 25 stocks.

The selection of index constituents is done as follows:

1. Using available price return data for the trailing one year of trading days leading up to the index rebalancing reference date, the volatilities of the stocks within the eligible universe are calculated.
2. Stocks meeting eligibility requirements as described under *Eligibility Criteria* are, then, ranked in descending order based on the inverse of their realized volatility.
3. Stocks ranked within the top 20% of the eligible universe stock count are automatically chosen for index inclusion.
4. Stocks which are current constituents that fall within the top 30% of the eligible universe stock count are then chosen for index inclusion-
5. If at this point the minimum stock count or 25% of the stocks in the eligible universe based on count have not been chosen, the remaining stocks are chosen in descending order based on the inverse of their realized volatility.

Constituent Weightings. At each rebalancing, the weight, w , for each index constituent, i , is set inversely proportional to its volatility and no single stock's weight can exceed 10% of the index.

$$w_i = \frac{\frac{1}{Volatility_i}}{\sum_{i=1}^N \frac{1}{Volatility}}$$

where:

N = The number of constituents at each rebalancing.

Please refer to Appendix B for volatility calculation details.

Rebalancing. The index is rebalanced quarterly after the close on the third Friday of March, June, September and December. As part of the rebalancing process, constituent stock weights are updated. The rebalancing reference date is the last business day of February, May, August and November, respectively. Constituents' index shares are calculated using closing prices on the Wednesday prior to the second Friday of the rebalancing month as the reference price. Index share amounts are calculated and assigned to each stock to arrive at the weights determined on the reference date.

S&P/B3 Momentum Index

Constituent Selection. The top 25% of securities in the eligible universe, based on momentum scores, are chosen, subject to a minimum count of 25 stocks. The momentum score of each stock is updated semi-annually at the March and September index rebalancings.

Buffer Rule. In order to reduce turnover, a 25% buffer rule based on the winsorized z-score is applied to the security selection at each rebalancing and is implemented as follows:

1. Stocks are ranked based on momentum score and those ranked within the top 20% of the eligible universe stock count are automatically chosen for index inclusion.
2. All stocks which are current constituents that fall within the top 30% of the eligible universe stock count are then chosen for index inclusion in order of their momentum score.
3. If at this point the minimum stock count or 25% of the stocks in the eligible universe have not been chosen, the remaining stocks are chosen based on their momentum score.

Constituent Weightings. For a given rebalancing date, all the securities eligible for inclusion in the index are weighted by the product of their market capitalization in the index universe and their momentum score, subject to security constraints. The maximum weight of each security is the lesser of 9% and three times its market capitalization weight in the index.

Please refer to Appendix C for details of the momentum score computation.

Float Adjustment. All issues in the index are assigned a float factor, called an Investable Weight Factor (IWF). The IWF ranges between 0 and 1 and is an adjustment factor that accounts for the publicly available shares of a company. IWFs are reviewed annually and the float-adjusted shares are used in the calculation of each stock's momentum weight.

Please refer to the S&P Dow Jones' Float Adjustment Methodology for a detailed description of float adjustment and Investable Weight Factor (IWF).

Rebalancing. The index is rebalanced semi-annually after the close on the third Friday of March and September. As part of the rebalancing process, constituent stock weights are updated. The rebalancing reference date is the last business day of February and August, respectively. Weights calculated as a result of the reference date data are implemented in the index using closing prices as of the respective rebalancing reference date.

S&P/B3 Quality Index

Constituent Selection. The top 25% of securities in the eligible universe, based on quality scores, are chosen, subject to a minimum count of 25 stocks. The quality score of each stock is derived from its return-on-equity, accruals ratio and financial leverage ratio. The quality score of each stock is updated semi-annually at the June and December index rebalancings.

Buffer Rule. A 25% buffer is applied to stocks already in the index in order to reduce portfolio turnover and is implemented as follows:

1. Stocks are ranked based on quality score and those ranked within the top 20% of the eligible universe stock count are automatically chosen for index inclusion.
2. All stocks which are current constituents that fall within the top 30% of the eligible universe stock count are then chosen for index inclusion in order of their quality score.
3. If at this point the minimum stock count or 25% of stocks in the eligible universe have not been chosen, the remaining stocks are chosen based on their quality score.

Constituent Weightings. For a given rebalancing date, all the securities eligible for inclusion in the index are weighted by their quality score multiplied by their market capitalization, subject to a maximum GICS sector weight of 40% and a maximum single stock weight of 10%. Each stock's weight is floored at 0.05%.

Please refer to Appendix D for quality score calculation details.

Rebalancing. The index is rebalanced semi-annually after the close on the third Friday of June and December. As part of the rebalancing process, constituent stock weights are updated. The rebalancing reference date is the last business day of May and November, respectively. Constituents' index shares are calculated using closing prices on the Wednesday prior to the second Friday of the rebalancing month as the reference price. Index share amounts are calculated and assigned to each stock to arrive at the weights determined on the reference date.

S&P/B3 Low Volatility High Dividend Index

Constituent Selection

1. All stocks in the selection universe are ranked in descending order by their 12-month trailing dividend yield, calculated as the security's dividends per share for the prior 12 months divided by its corresponding stock price as of rebalancing reference date.
2. The top 50% stocks with the highest dividend yield are selected.
3. Using available price return data for the trailing one year trading days leading up to the index rebalancing reference date, the realized volatilities of the selected highest yielding stocks are calculated. Realized volatility is defined as the standard deviation of the security's daily price returns in local currency over the prior one year of trading days.
4. The selected highest yielding stocks are, then, ranked in ascending order by realized volatility. The top 60% securities with the lowest realized volatility form the index, subject to a minimum count of 20 stocks.
5. If, at this point, the minimum stock count of 20 has not been met, the remaining stocks are chosen based on the lowest realized volatility until the minimum count is reached.

Constituent Weightings. For a given rebalancing date, all the securities eligible for inclusion in the index are weighted by their trailing 12-month dividend yield, subject to the maximum weight of each security being the lower of 15% and five times its liquidity weight. Liquidity is based on the security's six-month MDVT.

Note that the capping algorithm redistributes the excess weight to the other stocks in proportion to their dividend yield weights. Where the capping algorithm fails, the liquidity weight cap will be relaxed by 0.5 in each iteration, until a solution is found.

Rebalancing. The index is rebalanced semi-annually after the close on the last business day of May and November. As part of the rebalancing process, index composition, and constituent stock weights are updated. The rebalancing reference date is the last business day of April and October, respectively. Index share amounts are calculated and assigned to each stock to arrive at the weights determined on the reference date.

S&P/B3 SmallCap Select Index

All stocks in the eligible universe are screened to verify index eligibility as defined in *Eligibility Criteria*. All stocks that meet all index eligibility criteria are further screened as follows:

Liquidity and FMC. At each rebalancing reference date companies are ranked based on liquidity and FMC. The two screens below are performed independently of the other, with those companies ranked within the percentiles defined below ineligible for index inclusion:

1. The 20% least liquid securities in the market (16% for current constituents), by six-month MDVT, are excluded.
2. The 20% smallest securities in the market (16% for current constituents), by FMC, are excluded.

Positive Earnings. At each rebalancing reference date a company's prior two years of annual earnings must each be positive. Annual earnings are defined as trailing earnings per share (EPS) for all companies except for Real Estate Investment Trusts (REITs). EPS over the last twelve months is given preference over fiscal year earnings per share data. For REITs, annual earnings are defined as Funds-From-Operations (FFO), if available. If FFO is not available for a REIT, then EPS is used. REITs are determined by their GICS industry code (601010). Current constituents that post two consecutive years of negative earnings become ineligible.

Constituent Selection. At each rebalancing reference date companies in the eligible universe passing the liquidity and FMC screens are then screened for positive earnings. All remaining companies in the eligible universe are selected and form the index.

Constituent Weightings. The index is FMC weighted.

Rebalancing. The index is rebalanced semi-annually after the close on the third Friday of June and December. The fundamental data reference date is the last business day in May and November, respectively. In addition to the semi-annual rebalancings, the index undergoes a reweighting after the close of the third Friday in March and September. The reference dates are the last business days of February and August, respectively.

S&P/B3 Ingenius Index

Constituent Selection. Eligible BDR's underlying stocks (U.S. listings) are ranked in descending order based on the product of their respective stock Growth Score multiplied by their FMC prior to the rebalancing reference date. The highest ranked 15 stocks are selected for index inclusion, subject to a minimum of six. If six stocks are not selected the eligibility criteria is relaxed, with the highest ranked non-constituent selected until the target constituent count is met.

Constituent Weightings. At each rebalancing constituents are weighted by Momentum score, subject to a single stock weight cap of 20%.

Please refer to Appendix C for information on momentum score computation.

Rebalancing. Index composition is rebalanced annually, effective after the market close on the third Friday of September. The rebalancing reference date is the last business day of July. In addition, the index is reweighted quarterly, effective after the market close on the third Friday of March, June, and December. Constituents' index shares are calculated using closing prices on the Wednesday prior to the second Friday of the rebalancing month as the reference price. Index share amounts are calculated and assigned to each stock to arrive at the weights determined on the reference date.

S&P/B3 Brazil ESG Index

Approach. The index uses a transparent, rules-based approach to define eligible constituents and a constituent weighting process based on companies' ESG performance resulting from the 'Corporate Sustainability Assessment' (CSA) conducted by SAM.

SAM uses the CSA results to then calculate the S&P DJI ESG Scores that are used in the index methodology. A company's ESG score may either be calculated from data received directly by a company completing the comprehensive assessment (together with supporting documents), or – in the absence of this – by using publicly available information.

For more information on SAM, please refer to <https://www.spglobal.com/esg/csa/>.

For more information on S&P DJI ESG Scores, please refer to the S&P DJI ESG Scores Methodology.

For the purposes of ESG assessment, companies are assigned to industries defined by SAM, and the assessment is largely specific to each industry. SAM uses GICS as its starting point for determining industry classification. At the industry group and sector levels, the SAM Industries match the standard GICS classifications, but some non-standard aggregations are done at the industry level.

Constituent Selection. At each rebalancing reference date the securities that satisfy the requirements in *Eligibility Criteria* are selected and form the index.

Constituent Weightings. At each rebalancing reference date, the index is S&P DJI ESG score weighted, subject to a single security weight cap with each security's weight capped at the lower of 10% and four times its liquidity weight. Liquidity is based on the security's six-month MDVT. For multiple share classes, stock weight is split proportionally to the FMC of the company subject to the 10% company level cap and the stock liquidity weight cap.

Note that the capping algorithm redistributes the excess weight to the other stocks in proportion to their S&P DJI ESG Score weights. Where the capping algorithm fails, the liquidity weight cap will be increased by 0.5, repeated iteratively until a solution is found.

Rebalancing. The index rebalances annually, effective after the close of the last business day of April. The rebalancing reference date is after the close of the last business day of March. In addition, the index is reweighted quarterly in July, October, and January. The reweighting reference dates are after the close of the last business days of June, September and December, respectively. The quarterly reweighting process uses the same S&P DJI ESG Scores as the annual rebalancing in April.

Index Maintenance

Index Calculations

The indices are calculated by means of the divisor methodology used in all S&P Dow Jones Indices' equity indices.

For more information on the index calculations for a particular index, please refer to the Capped and Non-Market Capitalization Weighted Indices sections of S&P Dow Jones Indices' Index Mathematics Methodology.

Additions and Deletions

The majority of additions and deletions occur as part of the index rebalancings. Since the indices do not have a fixed number of constituents, additions to and deletions from an index may not be the same number.

S&P/B3 Brazil ESG Index. Index additions are generally made only during the annual rebalancing unless as a result of a spin-off or demerger from an existing constituent. Spun-off companies added following the composition reference date are assigned the same ESG Score as the parent company.

In addition, at the discretion of the Index Committee, a stock may be removed from the index if an MSA is raised.

Spin-Offs. For all the indices in this methodology except the S&P/B3 Non-State Owned Enterprises Index, the spun-off company is added to the index at a zero price and will be dropped from the index after the first day of regular way trading provided the drop event has been announced at least two days prior to the drop date. The S&P/B3 Non-State Owned Enterprises Index will keep the spun-off company in the index to be reevaluated at the subsequent annual rebalancing.

Corporate Actions

The table below details the most common corporate actions and index treatment for the following indices:

- S&P/B3 High Beta Index
- S&P/B3 Non-State Owned Enterprise Index
- S&P/B3 Enhanced Value Index
- S&P/B3 Inverse-Risk Weighted Index
- S&P/B3 Low Volatility Index
- S&P/B3 Momentum Index
- S&P/B3 Quality Index
- S&P/B3 Low Volatility High Dividend Index
- S&P/B3 Ingenius Index
- S&P/B3 Brazil ESG Index

Corporate Action	Adjustment Made to Index	Divisor Adjustment?
Spin-off	Please refer to the Treatment of Spin-offs in <i>S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology</i> .	
Rights Offering	The price is adjusted to the Price of the Parent Company minus (the Price of the Rights Offering/Rights Ratio). Index shares change so that the company's weight remains the same as its weight before the rights offering.	No
Stock Dividend, Stock Split, Reverse Stock Split	Index shares are multiplied by and price is divided by the split factor.	No
Share Issuance, Share Repurchase, Equity Offering or Warrant Conversion	None.	No
Special Dividends	Price of the stock making the special dividend payment is reduced by the per share special dividend amount after the close of trading on the day before the dividend ex-date.	Yes
Constituent Change	Except for spin-offs, there are no intra-rebalancing additions.	-
	Deletions due to delistings, acquisition or any other corporate event resulting in the deletion of the stock from the index will cause the weights of the rest of the stocks in the index to change. Relative weights will stay the same.	Yes

For more information, please refer to *S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology*.

Other Adjustments

In cases where there is no achievable market price for a stock being deleted, it can be removed at a zero or minimal price at the Index Committee's discretion, in recognition of the constraints faced by investors in trading bankrupt or suspended stocks.

Currency of Calculation and Additional Index Return Series

The indices are calculated in Brazilian reals and U.S. dollars.

Real-time spot Forex rates, as supplied by Reuters, are used for ongoing real-time index calculation.

WM/Reuters foreign exchange rates are taken daily at 04:00 PM London time and used in the calculation of the index. These mid-market fixings are calculated by the WM Company based on Reuters' data and appear on Reuters pages WMRA.

In addition to the indices detailed in this methodology, additional return series versions of the indices may be available, including, but not limited to: currency, currency hedged, decrement, fair value, inverse, leveraged, and risk control versions. For a list of available indices, please refer to [S&P DJI's All Indices by Methodology Report](#).

For information on the index calculation, please refer to *S&P Dow Jones Indices' Index Mathematics Methodology*.

For the inputs necessary to calculate certain types of indices, including decrement, dynamic hedged, fair value, and risk control indices, please refer to the Parameters documents available at www.spdji.com.

Base Dates and History Availability

Index history availability, base dates, and base values are shown in the table below.

Index	Launch Date	First Value Date	Base Date	Base Value
S&P/B3 High Beta Index	01/21/2019	03/22/1999	03/22/1999	1000
S&P/B3 Non-State Owned Enterprise Index	06/01/2017	03/18/2005	03/18/2005	1000
S&P/B3 Enhanced Value Index	04/30/2015	12/17/1999	12/17/1999	1000
S&P/B3 Inverse-Risk Weighted Index	04/30/2015	09/17/1999	09/17/1999	1000
S&P/B3 Low Volatility Index	04/30/2015	09/17/1999	09/17/1999	1000
S&P/B3 Momentum Index	04/30/2015	06/30/1999	06/30/1999	1000
S&P/B3 Quality Index	04/30/2015	12/17/1999	12/17/1999	1000
S&P/B3 Low Volatility High Dividend Index	08/07/2019	05/31/2007	05/31/2007	1000
S&P/B3 SmallCap Select Index	01/20/2020	12/17/1999	12/17/1999	100
S&P/B3 Ingenius Index	05/11/2020	09/19/2014	09/19/2014	100
S&P/B3 Brazil ESG Index	08/31/2020	04/30/2014	04/30/2014	100

Index Data

Calculation Return Types

S&P Dow Jones Indices calculates multiple return types, which vary based on the treatment of regular cash dividends. The classification of regular cash dividends is determined by S&P Dow Jones Indices.

- Price Return (PR) versions are calculated without adjustments for regular cash dividends.
- Gross Total Return (TR) versions reinvest regular cash dividends at the close on the ex-date without consideration for withholding taxes.
- Net Total Return (NTR) versions, if available, reinvest regular cash dividends at the close on the ex-date after the deduction of applicable withholding taxes.

In the event there are no regular cash dividends on the ex-date, the daily performance of all three indices will be identical.

For a complete list of indices available, please refer to the daily index levels file (“.SDL”).

For more information on the classification of regular versus special cash dividends as well as the tax rates used in the calculation of net return, please refer to S&P Dow Jones Indices’ Equity Indices Policies & Practices Methodology.

For more information on the calculation of return types, please refer to S&P Dow Jones Indices’ Index Mathematics Methodology.

Index Governance

Index Committee

The indices are maintained by the S&P/B3 Equity Index Committee. The Index Committee meets regularly. All committee members are full-time professional members of S&P Dow Jones Indices and B3's staff. At each meeting, the Index Committee reviews pending corporate actions that may affect index constituents, statistics comparing the composition of the indices to the market, companies that are being considered as candidates for addition to an index, and any significant market events. In addition, the Index Committee may revise index policy covering rules for selecting companies, treatment of dividends, share counts or other matters.

S&P Dow Jones Indices considers information about changes to its indices and related matters to be potentially market moving and material. Therefore, all Index Committee discussions are confidential.

S&P Dow Jones Indices' Index Committees reserve the right to make exceptions when applying the methodology if the need arises. In any scenario where the treatment differs from the general rules stated in this document or supplemental documents, clients will receive sufficient notice, whenever possible.

In addition to the daily governance of indices and maintenance of index methodologies, at least once within any 12-month period, the Index Committee reviews the methodology to ensure the indices continue to achieve the stated objectives, and that the data and methodology remain effective. In certain instances, S&P Dow Jones Indices may publish a consultation inviting comments from external parties.

For information on Quality Assurance and Internal Reviews of Methodology, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Index Policy

Announcements

All index constituents are evaluated daily for data needed to calculate index levels and returns. All events affecting the daily index calculation are typically announced in advance via the Index Corporate Events report (SDE), delivered daily to all clients. Any unusual treatment of a corporate action or short notice of an event may be communicated via email to clients.

For more information, please refer to the Announcements section of S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Pro-forma Files

In addition to the corporate events file (.SDE), S&P Dow Jones Indices provides constituent pro-forma files each time the indices rebalance. The pro-forma file is typically provided daily in advance of the rebalancing date and contains all constituents and their corresponding weights and index shares effective for the upcoming rebalancing. Since index shares are assigned based on reference prices prior to the rebalancing, the actual weight of each stock at the rebalancing differs from these weights due to market movements.

Please visit www.spdji.com for a complete schedule of rebalancing timelines and pro-forma delivery times.

Holiday Schedule

The indices are calculated daily when the Brazilian equity markets are open.

A complete holiday schedule for the year is available at www.spdji.com.

Rebalancing

The Index Committee may change the date of a given rebalancing for reasons including market holidays occurring on the scheduled rebalancing date. Any such change will be announced with proper advance notice where possible.

Unexpected Exchange Closures

For information on Unexpected Exchange Closures, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Recalculation Policy

For information on the recalculation policy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Real-Time Calculation

Real-time, intra-day, index calculations are executed for certain indices, whenever B3 is open. Real-time indices are not restated.

For information on Calculations and Pricing Disruptions, Expert Judgment and Data Hierarchy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

Contact Information

For any questions regarding an index, please contact: index_services@spglobal.com.

Index Dissemination

Index levels are available through S&P Dow Jones Indices' Web site at www.spdji.com, major quote vendors (see codes below), numerous investment-oriented Web sites, and various print and electronic media.

Tickers

The table below lists headline indices covered by this document. All versions of the below indices that may exist are also covered by this document. Please refer to [S&P DJI's All Indices by Methodology Report](#) for a complete list of indices covered by this document.

Index (Currency)	Return Type	Bloomberg
S&P/B3 High Beta (USD)	Price Return Total Return Net Total Return	SPBOHBBP SPBOHBBT --
S&P/B3 High Beta (BRL)	Price Return Total Return Net Total Return	SPBOHBUP SPBOHBUT --
S&P/B3 Non-State Owned Enterprises Index (USD)	Price Return Total Return Net Total Return	SPBRXSUP SPBRXSUT SPBRXSUN
S&P/B3 Non-State Owned Enterprises Index (BRL)	Price Return Total Return Net Total Return	SPBRXSBP SPBRXSBT SPBRXSBN
S&P/B3 Enhanced Value Index (USD)	Price Return Total Return Net Total Return	SPEVBUP SPEVBUT SPEVBUN
S&P/B3 Enhanced Value Index (BRL)	Price Return Total Return Net Total Return	SPEVBBP SPEVBBT SPEVBBN
S&P/B3 Inverse-Risk Weighted Index (USD)	Price Return Total Return Net Total Return	SPBRRWUP SPBRRWUT SPBRRWUN
S&P/B3 Inverse-Risk Weighted Index (BRL)	Price Return Total Return Net Total Return	SPBRRWBP SPBRRWBT SPBRRWBN
S&P/B3 Low Volatility Index (USD)	Price Return Total Return Net Total Return	SPBRLVUP SPBRLVUT SPBRLVUN
S&P/B3 Low Volatility Index (BRL)	Price Return Total Return Net Total Return	SPBRLVBP SPBRLVBT SPBRLVBN
S&P/B3 Momentum Index (USD)	Price Return Total Return Net Total Return	SPBRMUP SPBRMUT SPBRMUN
S&P/B3 Momentum Index (BRL)	Price Return Total Return Net Total Return	SPBRMBP SPBRMBT SPBRMBN

Index (Currency)	Return Type	Bloomberg
S&P/B3 Quality Index (USD)	Price Return Total Return Net Total Return	SPBRQUP SPBRQUT SPBRQUN
S&P/B3 Quality Index (BRL)	Price Return Total Return Net Total Return	SPBRQBP SPBRQBT SPBRQBN
S&P/B3 Low Volatility High Dividend Index (USD)	Price Return Total Return	SPBRLHUP SPBRLHUT
S&P/B3 Low Volatility High Dividend Index (BRL)	Price Return Total Return	SPBRLHBP SPBRLHBT
S&P/B3 SmallCap Select Index (BRL)	Price Return Total Return	SPB3SSBP SPB3SSBT
S&P/B3 Ingenius Index (USD)	Price Return Total Return	SPBRIGUP SPBRIGUT
S&P/B3 Ingenius Index (BRL)	Price Return Total Return	SPBRIGBP SPBRIGBT
S&P/B3 Brazil ESG (BRL)	Price Return Total Return	SPBRESBP SPBRESBT
S&P/B3 Brazil ESG (USD)	Price Return Total Return	SPBRESUP SPBRESUT

Index Data

Daily constituent and index level data are available via subscription.

For product information, please contact S&P Dow Jones Indices, www.spdji.com/contact-us.

Web site

For further information, please refer to S&P Dow Jones Indices' Web site at www.spdji.com.

Appendix A – Value Score

Fundamental Ratios Calculation

The first step to determine the overall value score is to calculate, as of the rebalancing reference date, the three fundamental ratios below for each security in the index universe. They are defined as follows:

- **Book Value-to-Price Ratio.** This is calculated as a company's latest book value per share divided by its price:

$$\text{Book Value-to-Price} = \frac{BVPS}{P}$$

- **Earnings-to-Price Ratio.** This is calculated as a company's trailing 12-month earnings per share divided by its price:

$$\text{Earnings-to-Price} = \frac{EPS}{P}$$

- **Sales-to-Price Ratio.** This is calculated as a company's trailing 12-month sales per share divided by its price:

$$\text{Sales-to-Price} = \frac{SPS}{P}$$

Outlier Handling and Winsorization. Outlier fundamental ratios are winsorized to ensure that the average values used to calculate the overall value score are less distorted by extreme values. For a given fundamental variable, the values for all securities are first ranked in ascending order. Then, for securities that lie above the 97.5 percentile rank or below the 2.5 percentile rank, their value is set as equal to the value of the 97.5 percentile ranked or the 2.5 percentile ranked security, whichever is applicable.

Z-score & Value Score Computation

Z-score Computation. Computing a z-score is a widely adopted method of standardizing a variable in order to combine it with other variables that may have a different scale or unit of measurement. After winsorizing all the three fundamental ratios, the z-score for each of the three ratios for each security is calculated using the mean and standard deviation of the relevant variable within the index universe.

The z-score is calculated as follows:

$$z_{\alpha} = \frac{(x_{\alpha} - \mu_{\alpha})}{\sigma_{\alpha}}$$

where:

z_{α} = Z-score for a given security

x_{α} = Winsorized variable for a given security

μ_{α} = Arithmetic mean of the winsorized variable in the index universe, excluding any missing values

σ_{α} = Standard deviation of the winsorized variable in the index universe

Average Z-score Computation. For each security, the average z-score is computed by taking a simple average of the three scores. Where there is a missing value, the average z-score is computed by taking a simple average of the remaining two scores. A security must have at least one z-score for it to be included in the index.

Outlier Handling and Winsorization. Outlier average z-scores are winsorized to ensure that the average values used to calculate the overall value score are less distorted by extreme values. To do this, for a given average z-score, the values for all securities are first ranked in ascending order. Then, for securities that lie above 4 or below -4, their value is set as equal to 4 or -4, whichever is applicable.

Value Score Computation. Using the winsorized average z-scores for the three value factors, a value score is computed for each of the securities. For a given security, if its winsorized average z-score is above 0, then its value score will be the addition of 1 and the average z-score. On the other hand, if its winsorized average score is below 0, then its value score will be the result of the reciprocal of 1 subtracted by its average z-score.

If average $Z > 0$, Value Score = $1 + Z$

If average $Z < 0$, Value Score = $(1 / (1 - Z))$

If average $Z = 0$, Value Score = 1

Appendix B – Volatility

Volatility Calculation

Volatility is defined as the standard deviation of the security's daily price returns in local currency over the prior one year of trading days. It can be mathematically expressed as:

$$\sqrt{\frac{\sum_{i=1}^N (X_i - \bar{X})^2}{N-1}}$$

where:

$$X_i = \text{Price change} = \frac{P_t}{P_{t-1}} - 1$$

P_t = Closing price of the stock on day t

P_{t-1} = Closing price of the stock on day $t-1$

t = 1 to N

\bar{X} = Average price change

N = Number of trading days in a year based on local calendar

Appendix C – Momentum Score

Momentum Value Calculation

Momentum value is calculated for each of the securities in the index universe on each of the rebalancing reference dates. The momentum value is determined as follows:

1. The momentum value is computed as the 12-month price change, excluding the most recent month of the security in **local** currency. If 12 months of price history is not available, momentum value is calculated from nine months of price history. The effective rebalancing month is stated as month (M).

a. Momentum Value = $\left(\frac{price_{M-2}}{price_{M-14}} \right) - 1$

b. Or, Momentum Value = $\left(\frac{price_{M-2}}{price_{M-11}} \right) - 1$ if 12 months of price history is not available.

NOTE 1: For example, if the effective rebalancing date is on 03/24/2014, the reference date is 02/28/2014, and the momentum value will be calculated based on the prices from 01/31/2014 ($price_{M-2}$) and 01/31/2013 ($price_{M-14}$).

NOTE 2: If there is no price available on day $M-2$ or day $M-14$, the price from the day prior will be used. If there is no price available on any of the ten days prior, the momentum value will be calculated using formula (b) above. If the same condition exists for formula (b), the stock is excluded from the index.

NOTE 3: For a stock to be included in the index, it must be trading for at least ten months prior to the rebalancing reference date.

2. The momentum value is further adjusted by the security's volatility to arrive at risk-adjusted momentum value.

$$\text{Risk-Adjusted Momentum Value} = \frac{\text{Momentum Value}_i}{\sigma_i}$$

where:

σ = Standard deviation of daily price returns for the same date period used in Step 1 above.

Z-Score & Momentum Score Computation

Z-Score Computation. Computing a z-score is a widely adopted method of standardizing a variable. The z-score for risk-adjusted momentum value for each security is calculated using the mean and standard deviation of the relevant variable within the index universe.

The z-score is calculated as follows:

$$z_\alpha = \frac{(x_\alpha - \mu_\alpha)}{\sigma_\alpha}$$

where:

z_{α} = Z-score for a given security

x_{α} = Observed value for a given security

μ_{α} = Arithmetic mean of the winsorized variable in the index universe, excluding any missing values

σ_{α} = Standard deviation of the winsorized variable in the index universe

Winsorization reduces the impact of outliers on a data set by limiting them to a designated value or score. For the S&P/B3 Momentum Index, the winsorized z-score of a security is capped at ± 3 .

Momentum Score Computation. Using the winsorized z-scores, a momentum score is computed for each of the securities. For a given security, if its winsorized z-score is above 0, then its momentum score will be the addition of 1 and the z-score. On the other hand, if its winsorized z-score is below 0, then its momentum score will be the result of the reciprocal of 1 subtracted from its z-score.

If $Z > 0$, Momentum Score = $1 + Z$

If $Z < 0$, Momentum Score = $(1 / (1 - Z))$

If $Z = 0$, Momentum Score = 1

Appendix D – Quality Score

Fundamental Ratios Calculation

The first step to determine the overall quality score is to calculate, as of the rebalancing reference date, the three fundamental ratios below for each security in the index universe. They are defined as follows:

- **Return on Equity (ROE).** This is calculated as a company's trailing 12-month earnings per share divided by its latest book value per share:

$$\text{ROE} = \frac{EPS}{BVPS}$$

- **Accruals Ratio.** This is computed using the change of a company's net operating assets over the last year divided by its average net operating assets over the last two years:

$$\text{Accruals Ratio} = \frac{(NOA_t - NOA_{t-1})}{((NOA_t + NOA_{t-1}))/2}$$

- **Financial Leverage Ratio.** This is calculated as a company's latest total debt divided by its book value.

$$\text{Leverage} = \frac{\text{Total Debt}}{(BVPS \times \text{Common Shares outstanding})}$$

Outlier Handling and Winsorization. Outlier fundamental ratios are winsorized to ensure that the average values used to calculate the overall quality score are less distorted by extreme values.

- **Return on Equity and Accruals Ratio.** For a given fundamental variable, the values for all securities are first ranked in ascending order. Then, for securities that lie above the 97.5 percentile rank or below the 2.5 percentile rank, their value is set as equal to the value of the 97.5 percentile ranked or the 2.5 percentile ranked security, whichever is applicable. If the underlying data points for a given stock's ROE are both negative, leading to a positive ROE, its ROE value will be excluded and the stock will be assigned an ROE Z-score set as equal to the ROE Z-score value of the 2.5 percentile ranked security.
- **Financial Leverage Ratio.** The values for all securities are first ranked in ascending order. Then, for securities that lie above the 97.5 percentile rank or below the 2.5 percentile rank, their value is set as equal to the value of the 97.5 percentile ranked or the 2.5 percentile ranked security, whichever is applicable. If the underlying data point for a given stock's BVPS is negative, leading to a negative Leverage, its Leverage value will be excluded and the stock will be assigned a Leverage Z-score set as equal to the Leverage Z-score value of the 2.5 percentile ranked security.

Z-score & Quality Score Computation

Z-score Computation. Computing a z-score is a widely adopted method of standardizing a variable in order to combine it with other variables that may have a different scale or unit of measurement. After winsorizing all the three fundamental ratios, the z-score for each of the three ratios for each security is calculated using the mean and standard deviation of the relevant variable within the index universe.

- **Return on Equity.** The z-score is calculated as follows:

$$z_{\alpha} = \frac{(x_{\alpha} - \mu_{\alpha})}{\sigma_{\alpha}}$$

- **Accruals and Financial Leverage Ratios.** The z-score is calculated as follows:

$$z_{\alpha} = -\frac{(x_{\alpha} - \mu_{\alpha})}{\sigma_{\alpha}}$$

where:

z_{α} = Z-score for a given security

x_{α} = Winsorized variable for a given security

μ_{α} = Arithmetic mean of the winsorized variable in the index universe, excluding any missing values

σ_{α} = Standard deviation of the winsorized variable in the index universe

Average Z-score Computation. For each security, the average z-score is computed by taking a simple average of the three scores. Where there is a missing value, the average z-score is computed by taking a simple average of the remaining two scores. A security must have at least one z-score for it to be included in the index.

Outlier Handling and Winsorization. Outlier average z-scores are winsorized to ensure that the overall quality scores are less distorted by extreme values. To do this, for a given average z-score, the values for all securities are first ranked in ascending order. Then, for securities that lie above 4 or below -4, their value is set as equal to 4 or -4, whichever is applicable.

Quality Score Computation. Using the winsorized average z-scores, a quality score is computed for each of the securities. For a given security, if its winsorized average z-score is above 0, then its quality score will be the addition of 1 and the average z-score. On the other hand, if its winsorized average score is below 0, then its quality score will be the result of the reciprocal of 1 subtracted by its average z-score.

If average $Z > 0$, Quality Score = $1 + Z$

If average $Z < 0$, Quality Score = $(1 / (1 - Z))$

If average $Z = 0$, Quality Score = 1

Appendix E – Methodology Changes

Methodology changes since January 1, 2015 are as follows:

Index	Change	Effective Date (After Close)	Methodology	
			Previous	Updated
S&P/B3 Ingenius	Multiple Share Classes	09/18/2020	Each company is represented once by the Designated Listing. For more information regarding the treatment of multiple share classes, please refer to Approach B within the Multiple Share Classes section of S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.	Each company is represented once by the most liquid share class line based on six-month ADVT as of the rebalancing reference date. The share class line included in the index may be changed if the six-month ADVT of the non-index share class line is twice as much as the included one.
S&P/B3 Indices	Index Name Change to S&P/B3 Indices	03/29/2019	The index names followed the BOVESPA naming convention (e.g. S&P/BOVESPA Non-State Owned Enterprises Index, S&P/BOVESPA Enhanced Value Index, S&P/BOVESPA Inverse-Risk Weighted Index).	The index names follow the B3 naming convention (e.g. S&P/B3 Non-State Owned Enterprises Index, S&P/B3 Enhanced Value Index, S&P/B3 Inverse-Risk Weighted Index).
S&P/BOVESPA Indices	Index Eligibility: Exceptional Trading Status	01/18/2019	--	<p>The index universe excludes issues designated to be under exceptional trading status, which means shares, or units representing shares, of issuers under judicial or extrajudicial reorganization, government- or court-ordered administration or intervention, as well as shares otherwise so designated pursuant to B3 rules.</p> <p>Current constituent stocks that trade under exceptional status become ineligible for index inclusion membership. If S&P Dow Jones Indices determines an index constituent has started trading under exceptional trading status, it will be removed from the index as soon as practicable once it is confirmed and with advance notice.</p> <p>A stock that falls under the exceptional trading status will not be eligible for index inclusion until 12 months after the exceptional trading status is lifted.</p>
S&P/BOVESPA Low Volatility Index	Constituent Weightings	12/18/2015	At each rebalancing, the weight, w , for each index constituent, i , is set inversely proportional to its volatility.	At each rebalancing, the weight, w , for each index constituent, i , is set inversely proportional to its volatility and no single stock's weight can exceed 10% of the index.

Index	Change	Effective Date (After Close)	Methodology	
			Previous	Updated
S&P/BOVESPA Enhanced Value, Inverse-Risk Weighted, Low Volatility, Momentum, and Quality Indices	Corporate Actions: Spin-offs	09/30/2015	Spin-offs are ineligible for inclusion in the index. Any price adjustments that occur due to a spin-off are a market cap neutral event for the parent stock.	Spin-offs are ineligible for inclusion in the index. When the price of the spin-off is not known, the spun-off company is added to the index at a zero price. Once it trades, it is dropped from the index. For further information, please refer to the Treatment of Spin-offs in the S&P Dow Jones Indices' Equity Indices Policies & Practices document.
S&P/BOVESPA Low Volatility Index	Introduction: Index Purpose	09/18/2015	The index is designed to measure the performance of the least volatile 20% of stocks within the Brazilian equity market.	The index is designed to measure the performance of the least volatile 25% of stocks within the Brazilian equity market.
S&P/BOVESPA Enhanced Value, Inverse-Risk Weighted, Low Volatility, Momentum, and Quality Indices	Index Eligibility: Liquidity	09/18/2015	For index eligibility, a security must, on the rebalancing reference date, have a minimum three-month average daily value traded of BRL 2 million.	For index eligibility, a security must, on the rebalancing reference date have: <ul style="list-style-type: none"> • A minimum six-month median daily value traded of BRL 5 million with a buffer of BRL 4 million for current constituents. • A minimum median value traded ratio of 2% with a buffer of 1.5% for current constituents for each of the prior 12 months. The median value traded ratio of each stock is defined as follows: <ul style="list-style-type: none"> ○ The monthly value traded ratio is calculated for each of the prior 12 months, by taking the median monthly daily value traded divided by its respective end of month float-adjusted market capitalization, where each month's value traded ratio must be at least 2% for non-constituents and 1.5% for current constituents. ○ Companies with less than 12 months of trading history will be considered for the S&P/BOVESPA Enhanced Value, Momentum, and Quality Indices as long as they have a trading history of at least six months and meet all other eligibility criteria.
S&P/BOVESPA Enhanced Value Index	Constituent Selection: Minimum Stock Count	09/18/2015	The top 20% of securities in the eligible universe, based on value scores, are chosen, subject to a minimum count of 20 stocks.	The top 25% of securities in the eligible universe, based on value scores, are chosen, subject to a minimum count of 25 stocks.
S&P/BOVESPA Low Volatility Index	Constituent Selection: Minimum Stock Count	09/18/2015	The top 20% of securities in the eligible universe, based on count and volatility are chosen, subject to a minimum count of 20 stocks.	The top 25% of securities in the eligible universe, based on count and volatility are chosen, subject to a minimum count of 25 stocks.
S&P/BOVESPA Momentum Index	Constituent Selection: Minimum Stock Count	09/18/2015	The top 20% of securities in the eligible universe, based on momentum scores, are chosen, subject to a minimum count of 20 stocks.	The top 25% of securities in the eligible universe, based on momentum scores, are chosen, subject to a minimum count of 25 stocks.

Index	Change	Effective Date (After Close)	Methodology	
			Previous	Updated
S&P/BOVESPA Quality Index	Constituent Selection: Minimum Stock Count	09/18/2015	The top 20% of securities in the eligible universe, based on quality scores, are chosen, subject to a minimum count of 20 stocks.	The top 25% of securities in the eligible universe, based on quality scores, are chosen, subject to a minimum count of 25 stocks.
S&P/BOVESPA Enhanced Value Index	Constituent Selection: Buffer Rule	09/18/2015	A 20% buffer is applied to stocks already in the index: 1. Stocks ranked within the top 16% of the eligible universe stock count, based on value score, are automatically selected. 2. All current constituents that fall within the top 24% of the eligible universe stock count are then selected in order of their value score. 3. If at this point the minimum stock count or 20% of the stocks in the eligible universe have not been chosen, the remaining stocks are chosen based on their value score.	A 25% buffer is applied to stocks already in the index: 1. Stocks ranked within the top 20% of the eligible universe stock count, based on value score, are automatically selected. 2. All current constituents that fall within the top 30% of the eligible universe stock count are then selected in order of their value score. 3. If at this point the minimum stock count or 25% of the stocks in the eligible universe have not been chosen, the remaining stocks are chosen based on their value score.
S&P/BOVESPA Momentum Index	Constituent Selection: Buffer Rule	09/18/2015	A 20% buffer based on the winsorized z-score is applied to the security selection: 1. Stocks ranked within the top 16% of the eligible universe stock count, based on momentum score, are automatically selected. 2. All current constituents that fall within the top 24% of the eligible universe stock count are then selected in order of their momentum score. 3. If at this point the minimum stock count or 20% of the stocks in the eligible universe have not been chosen, the remaining stocks are chosen based on their momentum score.	A 25% buffer based on the winsorized z-score is applied to the security selection: 1. Stocks ranked within the top 20% of the eligible universe stock count, based on momentum score, are automatically selected. 2. All current constituents that fall within the top 30% of the eligible universe stock count are then selected in order of their momentum score. 3. If at this point the minimum stock count or 25% of the stocks in the eligible universe have not been chosen, the remaining stocks are chosen based on their momentum score.
S&P/BOVESPA Quality Index	Constituent Selection: Buffer Rule	09/18/2015	A 20% buffer is applied to stocks already in the index: 1. Stocks ranked within the top 16% of the eligible universe stock count, based on quality score, are automatically selected. 2. All current constituents that fall within the top 24% of the eligible universe stock count are then selected in order of their quality score. If at this point the minimum stock count or 20% of the stocks in the eligible universe have not been chosen, the remaining stocks are chosen based on their quality score.	A 25% buffer is applied to stocks already in the index: 1. Stocks ranked within the top 20% of the eligible universe stock count, based on quality score, are automatically selected. 2. All current constituents that fall within the top 30% of the eligible universe stock count are then selected in order of their quality score. If at this point the minimum stock count or 25% of the stocks in the eligible universe have not been chosen, the remaining stocks are chosen based on their quality score.

Index	Change	Effective Date (After Close)	Methodology	
			Previous	Updated
S&P/BOVESPA Low Volatility Index	Constituent Selection: Steps 3-6	09/18/2015	<ol style="list-style-type: none"> 3. Stocks ranked within the top 16% of the eligible universe stock count are automatically selected. 4. All current constituents that fall within the top 24% of the eligible universe stock count are then selected up to 20% of the eligible universe stock count. 5. If at this point 20% of the stocks in the eligible universe based on count have not been chosen, the remaining stocks are chosen in descending order based on the inverse of their realized volatility up to the 20% eligible universe stock count limit. 6. If at this point the minimum stock count has not been reached, the remaining stocks are selected in descending order based on the inverse of their realized volatility from the eligible universe until the index has a total of 20 stocks. 	<ol style="list-style-type: none"> 3. Stocks ranked within the top 20% of the eligible universe stock count are automatically selected. 4. All current constituents that fall within the top 30% of the eligible universe stock count are then selected up to 25% of the eligible universe stock count. 5. If at this point 25% of the stocks in the eligible universe based on count have not been chosen, the remaining stocks are chosen in descending order based on the inverse of their realized volatility up to the 25% eligible universe stock count limit. 6. If at this point the minimum stock count has not been reached, the remaining stocks are selected in descending order based on the inverse of their realized volatility from the eligible universe until the index has a total of 25 stocks.
S&P/BOVESPA Enhanced Value, Inverse- Risk Weighted, Low Volatility, Momentum, and Quality Indices	Index Eligibility: Additional Exclusion Rules	06/19/2015	--	In addition, Brazilian Depository Receipts (BDRs) are not eligible for index consideration.

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