S&P Tilt Index Series
Methodology

October 2015

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Introduction

S&P Dow Jones Indices has created a series of indices that are designed to tilt a given index toward securities with putatively-desirable characteristics and away from securities with putatively-undesirable characteristics. The tilt is achieved by ranking all constituents of a parent index based on a selected attribute, increasing the weights of stocks having a high ranking on that attribute and decreasing the weights of stocks having a low ranking.

Highlights

The S&P Tilt Indices maintain the constituents of the underlying index while adjusting constituent weights.

Many of the characteristics of capitalization-weighting are retained, as changes in market capitalization between rebalancing dates affects the weights of the constituents.

For more information of modified market capitalization indices, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.

Index Family

S&P 1500 Reduced Volatility Tilt Index. The S&P 1500 Reduced Volatility Tilt Index contains all constituent members of the S&P Composite 1500, weighted so that stocks with relatively low volatility are overweight relative to the parent S&P 1500 and stocks with relatively high volatility are underweight. The index is intended to provide diversified exposure to relative low volatility in the U.S. stock market.

S&P 1500 Positive Momentum Tilt Index. The S&P 1500 Positive Momentum Tilt Index contains all constituent members of the S&P Composite 1500, weighted so that stocks with relatively strong momentum are overweight relative to the parent S&P 1500 and stocks with relatively weak momentum are underweight. The index is intended to provide diversified exposure to relative positive momentum in the U.S. stock market.

S&P 1500 Low Valuation Tilt Index. The S&P 1500 Low Valuation Tilt Index contains all constituent members of the S&P Composite 1500, weighted so that companies with relatively cheap valuations are overweight relative to the parent S&P 1500 and companies with relatively expensive valuations are underweight. The index is intended to provide diversified exposure to relative low valuation in the U.S. stock market.

This methodology was created by S&P Dow Jones Indices 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 so that the index continues to achieve its objective.

Eligibility Criteria

Index Eligibility

The S&P 1500 Reduced Volatility Tilt, the S&P 1500 Positive Momentum Tilt and the S&P 1500 Low Valuation Tilt Indices are based on the S&P Composite 1500. All index constituents are members of the S&P 1500 and follow the eligibility criteria for that index.

Timing of Changes

Additions and Deletions. Except for major corporate actions, such as mergers and spin-offs, additions and deletions of companies generally only take place at the time of the reconstitution. In addition, constituents removed from the S&P Composite 1500 Index are also removed from their S&P Tilt Index simultaneously.

For more information on the S&P Composite 1500 Index methodology, please refer the S&P U.S Indices methodology document at www.spdji.com.

Index Construction

Approaches

The methodology for each index employs a modified market capitalization weighting scheme which seeks to overweight stocks which have high exposure to a given attribute and underweight stocks with low exposure. The indices are calculated using the divisor methodology used in most S&P Dow Jones' equity indices.

For more information on modified market capitalization indices, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.

Constituent Weightings

The S&P Tilt Indices methodology tilts a universe of securities by increasing the weights of securities with desirable attributes and decreasing the weights of those with undesirable attributes. The methodology tilts by allocating weight across 20 attribute-sorted, capitalization-weighted sub-portfolios, each of which represents approximately 5% of the market capitalization of a given parent index. Securities are allocated to one, and only one, sub-portfolio. Securities that breach the target 5% weight increment are allocated to the sub-portfolio that minimizes the difference between the break-point and the target breakpoint. The tilt is achieved by applying a factor to each sub-portfolio (and, therefore, to each sub-portfolio constituent) that determines the allocation of weight to each sub-portfolio at reconstitution. The weight of each stock in the index is proportional to its market capitalization and its sub-portfolio allocation factor.

S&P 1500 Reduced Volatility Tilt Index

Stocks are sorted based on the variance of their previous 60 monthly price returns (or all monthly returns if a stock does not have a 60-month history). Stocks are then assigned to a sub-portfolio based on the rules above. The variance of each sub-portfolio is calculated as a weighted average (with weights based on the weights in the underlying index) of the variance of stocks in the sub-portfolio. The standard deviation of each sub-portfolio is derived as follows:

$$SubPort\_stdev_j = \sqrt{\sum_{i=1}^{n}(IndexCap_{i\_0} / IndexCap_{j\_0}) * \text{var}_{i\_60}} \qquad (1)$$

where:

$IndexCap_{i\_0}$ = Float-adjusted market cap of constituent *i* in the parent index.

$IndexCap_{j\_0}$ = Total float-adjusted market cap of sub-portfolio *j* in the parent index.

$$Var_{i\_60} \quad = \text{Variance of constituent } i \text{ measured over the previous 60 monthly}$$
$$\text{price returns.}$$

The sub-portfolio adjustment factor is then arrived at by dividing the inverse of each sub-portfolio standard deviation by the sum of the products of the inverse standard deviation and the weight of each sub-portfolio.

$$SubPort\_InvSD_j = 1/(SubPort\_stdev_j) \tag{2}$$

$$SubPort\_Alloc\_Factor_j = SubPort\_InvSD_j /(\sum_{j=1}^{20} SubPort\_cap\_wt_j * SubPort\_InvSD_j) \tag{3}$$

where:

$$SubPort\_Alloc\_Factor_j = \text{The volatility tilt factor of sub-portfolio } j.$$

S&P 1500 Positive Momentum Tilt Index

Stocks are sorted in ascending order by their 11-month total return ending on the rebalancing reference date and are assigned to a sub-portfolio based on the rules above.

Stocks in each sub-portfolio are assigned unadjusted momentum factors based on the following table:

Sub-Portfolio	Unadjusted Momentum Factor
1	0.05
2	0.15
3	0.25
4	0.35
5	0.45
6	0.55
7	0.65
8	0.75
9	0.85
10	0.95
11	1.05
12	1.15
13	1.25
14	1.35
15	1.45
16	1.55
17	1.65
18	1.75
19	1.85
20	1.95

To maintain consistency with the total market capitalization of the underlying index these factors are adjusted by dividing each factor by the sum of the product of the weight and the momentum factor of each of the sub-portfolios as follows:

$$Adj\_Mom\_Factor_j = Unadj\_Mom\_Factor_j /(\sum_{j=1}^{20} SubPort\_cap\_wt_j * Unadj\_Mom\_Factor_j) \quad (4)$$

where:

$Adj\_Mom\_Factor_j$ = Adjusted momentum factor for sub-portfolio j.

$Unadj\_Mom\_Factor$ = Unadjusted momentum factor for sub-portfolio j.

$SubPort\_cap\_wt_j$ = Weight of sub-portfolio j in the underlying index as of the reference date.

S&P 1500 Low Valuation Tilt Index

Companies are sorted based on their relative valuation and are assigned to a sub-portfolio based on the rules above. Relative valuation is determined in a four-step process:

First, a "factor weight" for each company is calculated for each of the following fundamental factors: (1) last 12 months reported earnings, (2) last 12 months cash flow, (3) last 12 month sales, (4) last 12 months ordinary dividends and (5) reported book value. Factor weights are calculated at the aggregate (not per-share) level and are based on float-adjusted market capitalization. A company's factor weight denotes the ratio of the company's fundamental factor to the aggregate value of that factor for the S&P Composite 1500. For example, if a company's factor weight for book value is 1.0%, that means that 1.0% of the S&P 1500's aggregate book value is accounted for by that company. Factor weights are computed for each of the last five years using historical financial data. For any 12-month period, any negative or unreported fundamental value is set to zero. For non-dividend paying companies, dividends are imputed at the cap-weighted yield of dividend paying companies in the universe.

Second, the factor weights for each company in each year are averaged to calculate a composite factor weight. This provides a series of five composite factor weights (one for each of the past five years) for each company in the universe.

Third, a single composite factor weight for each company is calculated by exponential smoothing as follows:

$$F_{smoothed\_i\_f} = w_4 * F_{t-4} + w_3 * F_{t-3} + w_2 * F_{t-2} + w_1 * F_{t-1} + w_0 * F_t \quad (5)$$

where:

$w_o = 0.35$ $w_3 = 0.11$

$w_1 = 0.29$ $w_4 = 0.05$

$w_2 = 0.20$

Finally, the relative valuation for each company i is then computed as:

$$Relative\_P/F_i = \frac{IndexCap_i / \sum_{i=1}^{n} IndexCap_i}{\sum_{f=1}^{5} (F_{smoothed\_i\_f} / \sum_{i=1}^{n} F_{smoothed\_i\_f})/5} \tag{6}$$

where:

n = The total number of companies in the universe

Companies are ranked based on their relative valuation and broken into sub-portfolios. The relative valuation for each sub-portfolio calculated as:

$$Relative\_P/F_{sub\_j} = \frac{IndexCap_{sub\_j} / \sum_{i=1}^{20} IndexCap_{sub\_j}}{\sum_{f=1}^{5} (F_{smoothed\_sub\_j\_f} / \sum_{i=1}^{20} F_{smoothed\_sub\_j\_f})/5} \tag{7}$$

where:

$$F_{smoothed\_sub\_j\_f} = \sum_{i=1}^{n} F_{smoothed\_i\_f}$$

n = the total number of companies in sub-portfolio j

The valuation factor for each sub-portfolio is then calculated as:

$$Valuation\_Factor_{sub\_j} = 1/\left(Relative\_P/F_{sub\_j}\right)$$

where:

$Valuation\_Factor_{sub\_j}$ = Valuation factor of sub-portfolio j.

$Relative\_P/F_{sub\_j}$ = Relative valuation of sub-portfolio j.

Multiple Classes of Stock

Some companies may have more than one share class line in the benchmark index. In the S&P Tilt Indices, both share lines are eligible.

In the S&P 1500 Reduced Volatility Tilt Index and S&P 1500 Positive Momentum Tilt Index, each share class line is allocated to a sub-portfolio independently based on its own attributes and float-adjusted market capitalization.

In the S&P 1500 Low Valuation Tilt Index, relative valuation is determined on a company level and will be shared by the multiple share class lines. Each company is

allocated to a sub-portfolio based on the company relative valuation and combined float-adjusted market capitalization.

Index Calculations

On any given day, the index value is the quotient of the weighted market capitalization of its constituents and its divisor. Continuity in index values is maintained by adjusting the divisor for certain corporate actions. The divisor's time series is, in effect, a chronological summary of all changes affecting the base capital of the index. The divisor is adjusted such that the index value at an instant prior to a change in base capital equals the value at an instant immediately following the change.

For more information on index level calculations please refer to S&P Dow Jones Indices' Index Mathematics Methodology at www.spdji.com.

Index Maintenance

Rebalancing Frequency

The S&P 1500 Reduced Volatility Tilt Index and the S&P 1500 Low Valuation Tilt Index are rebalanced annually after the close on the third Friday of April of each year. The rebalancing reference date is after the close of the last business day of March each year.

The S&P 1500 Positive Momentum Tilt Index is rebalanced quarterly after the close on the third Friday of January, April, July and October of each year. The rebalancing reference date is after the close of the last business day of December, March, June and September, respectively.

If a stock is removed from the underlying parent index between the rebalancing reference and implementation dates, the weight of the removed stock is proportionately redistributed among all other stocks in the index. Additions to the underlying parent index effective after the rebalancing reference date are excluded from the eligible rebalancing universe.

The constituents' shares are calculated using closing prices on 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. Since index shares are assigned based on prices one week prior to rebalancing, the actual weight of each stock at the rebalancing differs from these weights due to market movements.

Corporate Actions

All corporate actions, excluding additions, flow through from the underlying parent index.

For more information on the S&P 1500 Index methodology, please refer to the S&P U.S Indices methodology document at www.spdji.com.

Base Date

For each index, the base date is March 31, 2006. The base value, for both the price return and total return series, is 1000. Daily returns are available from March 31, 2006.

Index Adjustments

Corporate Action	Adjustment Made to Index	Divisor Adjustment?
Spin-Off	See below for more information.	
Rights Offering	The price is adjusted to the Price of the Parent Company minus (the Price of the Rights Offering/Rights Ratio). Index Shares are adjusted at the full rights ratio.	Yes
Stock Split	Index Shares are multiplied by and price is divided by the split factor.	No
Share Issuance or Share Repurchase	Index Shares are adjusted.	Yes
Special Dividends	The 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
Delisting, acquisition or any other corporate action resulting in the deletion of the stock from the underlying index.	The stock is dropped from the index. This causes the weights of the rest of the stocks in the index to change proportionately. Additions are made to the index only at rebalancings.	Yes

Spin-offs. The spun-off company is added to all the indices of which the parent is a constituent, at a zero price at the market close of the day before the ex-date (with no divisor adjustment). The spun-off company is then removed after at least one day of regular way trading (with a divisor adjustment).

For further information, please refer to the Treatment of Spin-offs in S&P Dow Jones Indices' Equity Indices Policies & Practices document located on our Web Site, www.spdji.com.

For more information on Corporate Actions, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices document located on our Web site, www.spdji.com.

Index Data

Total Return Indices

The indices have a total return counterpart, which assumes dividends are reinvested in the index after the close on the ex-date.

S&P Dow Jones Indices calculates daily return series using both gross and net cash dividends reinvested. Net return reinvested is reflective of the return to an investor where dividends are reinvested after the deduction of withholding tax. The tax rate applied is the rate to non-resident institutions that do not benefit from double taxation treaties.

For more information on the tax rates used in the calculation of net return indices, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices document located on our Web site, www.spdji.com.

Please refer to S&P Dow Jones Indices' Index Mathematics Methodology for more information on total return calculations.

Index Governance

Index Committee

The Americas Thematic and Strategy Index Committee maintains the indices. 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.

For information on Quality Assurance and Internal Reviews of Methodology, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices document located on our Web site, www.spdji.com.

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 up to 30 days in advance via the Index Corporate Events report (.SDE), delivered daily via ftp to all clients. Any unusual treatment of a corporate action or short notice of an event may be communicated via email to clients.

All methodology changes are posted to the S&P Dow Jones Indices' Web site and announced via email to all clients. The latest available version is posted on the Web site at *www.spdji.com*.

For more information on S&P Dow Jones Indices' announcements, please refer to the Announcement Policy located on our Web site, www.spdji.com.

Pro-forma Files

In addition to the corporate events file (.SDE), S&P Dow Jones Indices provides constituent pro-forma files for each index each time the indices rebalance. The pro-forma file is typically provided daily five business days 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 prices one week 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 all business days of the year when the U.S. equity market is open.

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

Unscheduled Market Closures

In situations where an exchange is forced to close early due to unforeseen events, such as computer or electric power failures, weather conditions or other events, S&P Dow Jones Indices will calculate the closing price of the indices based on (1) the closing prices published by the exchange, or (2) if no closing price is available, the last regular trade reported for each security before the exchange closed. If an exchange fails to open due to unforeseen circumstances, S&P Dow Jones Indices treats this closure as a standard market holiday. The index will use the prior day's closing prices and shifts any corporate actions to the following business day. If all exchanges fail to open or in other extreme circumstances, S&P Dow Jones Indices may determine not to publish the index for that day.

For further information on Unexpected Exchange Closures, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices document located on our Web site, www.spdji.com.

Recalculation Policy

S&P Dow Jones Indices reserves the right to recalculate an index under certain limited circumstances. S&P Dow Jones Indices may choose to recalculate and republish an index if it is found to be incorrect or inconsistent within two trading days of the publication of the index level in question for one of the following reasons:

1. Incorrect or revised closing price
2. Missed corporate event
3. Late announcement of a corporate event
4. Incorrect application of corporate action or index methodology

Any other restatement or recalculation of an index is only done under extraordinary circumstances to reduce or avoid possible market impact or disruption as solely determined by the Index Committee.

For more information on the recalculation policy please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices document located on our Web site, www.spdji.com.

For information on Calculations and Pricing Disruptions, Expert Judgment and Data Hierarchy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices document located on our Web site, www.spdji.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

Index	Return Type	Bloomberg	Reuters
S&P 1500 Low Valuation Tilt Index	Price Return	SPCLVTUP	.SP15TLLV
	Total Return	SPCLVTUT	.SP15TLLVTR
S&P 1500 Reduced Volatility Tilt Index	Price Return	SPCRVTUP	.SP15TLRV
	Total Return	SPCRVTUT	.SP15TLRVTR
S&P 1500 Positive Momentum Tilt Index	Price Return	SPCPMTUP	.SP15TLPM
	Total Return	SPCPMTUT	.SP15TLPMTR

FTP

Daily index levels and additional data are available via FTP 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

Methodology Changes

Methodology changes since January 1, 2015 are as follows:

Change	Effective Date (After Close)	Methodology	
		Previous	**Updated**
Treatment of Spin-offs	09/30/2015	If the spin-off was added to the parent index (S&P Composite 1500), both the parent company and spun-off company remained in the index. When there was no market-determined price available for the spin, the spin was added to the index at zero price at the close of the day before the ex-date. If the spin-off was not added to the parent index (S&P Composite 1500), the weight of the parent company did not change. The price was adjusted to the Price of the Parent Company minus (the Price of the Spun-off Company/Share Exchange Ratio). Index shares changed so that the company's weight remained the same as its weight before the spin-off.	The spun-off company is added to all the indices of which the parent is a constituent, at a zero price at the market close of the day before the ex-date (with no divisor adjustment). The spun-off company is then removed after at least one day of regular way trading (with a divisor adjustment).

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