

STANDARD  
& POOR'S

# S&P DYNAMIC MULTI-ASSET STRATEGY INDEX

INDEX METHODOLOGY

July 2007

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# Introduction

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The S&P Dynamic Multi-Asset Strategy Index (“**SPDMAS**”) is an objective, dynamic, asset allocation strategy index that follows a model based on a pre-defined set of rules operating on both macroeconomic and valuation metrics (the “**Input Variables**”). At the beginning of each six-month rebalancing period, three separate decision signals are derived from the rules as they apply to specific, defined data. Based on these signals, one of 27 asset allocation strategies is selected to be the investment strategy for the next six-month period.

Each of the 27 asset allocation strategies consists of a pre-defined mix (the “**Asset Class Mix**”) of five different asset classes: European equity, U.S. equity, European fixed-income, commodity-linked equity basket, and European Short-term Cash (the “**Asset Classes**”). These 27 asset allocation strategies are designed to take into account forward-looking views on the equity, fixed-income and commodity markets. Based on the Input Variables, the view on the future of each of the three decision signals is either bullish, neutral, or bearish.

In the decision process, the Input Variables used are in local currencies, to mitigate any possible distortions arising from currency translations. However, once the allocation strategy has been chosen, the calculations of all performances are based on Euro-converted data. The SPDMAS index values are denominated in Euro.

The Euro was launched in January of 1999. For the purpose of the backtest and performance evaluation, data begins in 1999, to ensure maximum consistency of the data series. This provided an original, historical testing period of a full seven years. The backtesting of SPDMAS was performed from January 1999 to December 2005, consisting of 14 six-month periods, with the first strategy decision implemented at month-end, December 1998.

## Highlights

Standard & Poor’s Dynamic Multi-Asset Strategy Index reflects the impact of changes in the underlying macroeconomic and valuation variables on the shifts in asset allocation strategies.

It is a quantitative, rules-based model that uses pre-defined rules operating on both macroeconomic and valuation metrics to arrive at asset allocation decisions.

The S&P 500, the S&P Europe 350, four energy and materials sector indices, IBOXX and EONIA indices are used as proxies for performance calculations.

They satisfy liquidity and market representation requirements, and are well known and widely publicized indices.

At any given time, the index holds positions in all eight indices, but the relative allocations among them are adjusted according to their relative future predicted performances, according to the model.

Through a bi-annual rebalancing process, the model chooses one of the 27 pre-designed asset allocation strategies, based on the view of the future of the combined outcomes of each of the three major decision signals.

# Index Construction

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## **Input Variables**

*For a list of defined terms used in this document, please refer to the Appendix.*

All Input Variables are based on currently reported historical data, as published by Bloomberg. This means, for the purpose of the backtest study, Standard & Poor's did not use initially reported data, but the most current version of the data, including revisions. Beginning with the August 2006 rebalancing, Standard & Poor's uses the data available as of the close of business on the Reference Date (10 February and 10 August of each year or, if such day is not a Scheduled Trading Day, the next following Scheduled Trading Day), and this data will not change, even if it is subsequently revised, as the strategy decisions have already been made based on the then available version of the data. Where applicable, comparisons between the U.S. and European economies will be made over the same time period, which may result in the application of data on a lagged basis to ensure that the data is applied on a consistent basis.

Standard & Poor's uses the data as reported in native currency, for the purpose of deciding whether each of the individual decisions is bullish, neutral or bearish. This is to spot the underlying trends as they exist in the market, before they might be perturbed by currency conversions. Thus, U.S. Input Variables are denominated in U.S. Dollar, and European Input Variables are denominated in Euro.

The individual Input Variables for each of the three major decision variables are as follows:

## **EQUITY**

### **Gross Domestic Product (GDP)**

**U.S. GDP.** GDP U.S. Chained 2000 Dollars YoY SA (Year-over year, seasonally adjusted), which is available from Bloomberg (Bloomberg ticker: GDP CYOY Index).

These data are quoted in percent and is calculated by the Bureau of Economic Analysis. The data series is available annually beginning 12/31/1930 and quarterly beginning 3/31/1948.

**European GDP.** Eurostat provides a quarterly series dating back to 3/31/1990. (Bloomberg ticker: EUGDEMU Index). It is calculated by Eurostat and quoted in millions of Euros. The European GDP is transformed to a year-over-year percent change.

### **Consumption**

**U.S. Consumer Consumption.** U.S. Personal Consumption Expenditures, Current Dollars, SAAR (Bloomberg ticker: PCE CUR\$ Index) is used. This monthly data series is calculated by the Bureau of Economic Analysis and is available beginning January 1959.

**European Consumer Consumption.** Eurostat GDP, Current Prices, Eurozone Household Consumption Expenditure (Bloomberg ticker: EUHCEMU Index) is used. This quarterly data series is calculated by Eurostat and begins on 3/31/1990.

### **Consumer Confidence**

**U.S. Consumer Confidence.** Conference Board Consumer Confidence, SA (1985=100) (Bloomberg ticker: CONCCONF Index). This monthly series is calculated by the Conference Board.

**European Consumer Confidence.** European Commission Economic Sentiment Indicator (ESI), Eurozone, (2000=100) (Bloomberg ticker: EUESEMU Index). This monthly series is calculated by the European Commission and is available beginning 1/31/1985. However, in order to comply with new Eurostat data series, the base year of the ESI was changed in August 2003 from 1995 to 2000.

### **Price-to-Earnings Ratio (P/E)**

**U.S. P/E.** S&P/Citigroup Global Equity Indices (PMI, Composite Industries)

**European P/E.** S&P/Citigroup Global Equity Indices (PMI, Composite Industries)

*For more information on these two P/E series, please visit Standard and Poor's Web site at [www.globalindices.standardandpoors.com](http://www.globalindices.standardandpoors.com).*

These indices use the version of P/E labeled "IBES FYO P/E".

### **Equity Return**

**U.S. Equity Return.** The S&P 500 (Bloomberg ticker – SPX Index). The S&P 500 is a float-adjusted, capitalization-weighted index of 500 stocks. The S&P 500 is designed to measure the performance of the broad U.S. domestic economy through changes in the aggregate market value of 500 stocks representing all major industries.

**European Equity Return.** The S&P Europe 350 (Bloomberg ticker – SPEURO Index). The S&P Europe 350 is a float-adjusted, capitalization-weighted index that measures the performance of equities in 17 Pan-European markets, covering approximately 70% of the total market cap. It offers an effective balance between broad market representation and liquidity.

The two equity indices used in this model are the price indices, as opposed to the total return indices, hence no dividends are reinvested.

## **FIXED INCOME**

### **European Gross Domestic Product (GDP)**

Eurostat provides a quarterly series dating back to 3/31/1990. (Bloomberg ticker: EUGDEMU Index). It is quoted in millions of Euros and is calculated by Eurostat. The European GDP is transformed to a year-over-year percent change.

### **European Inflation**

Eurostat Eurozone MUICP, All Items, YoY, NSA (1996=100). MUICP stands for the Monetary Union Index of Consumer Prices. It is a monthly data series dating from 1/31/1991. (Bloomberg ticker: ECCPEMUY Index).

### **European Interest Rates**

ECB Minimum Bid, Refinancing Rate, 1 Week. This daily series is calculated by the European Central Bank (Bloomberg ticker: EURR002W Index). It represents the ECB's main refinancing operations minimum bid rate. The data are available daily from 12/18/1998.

## **COMMODITIES**

The S&P GSCI™ Excess Return (Bloomberg ticker: SPGSCIP Index).

The Index has daily closing prices from 12/31/1969. The source of the data is the S&P GSCI™ Index Series. The S&P GSCI™ Excess Return components are updated on a yearly basis. The S&P GSCI™ Excess Return index measures the uncollateralized return from rolling futures forwarded each month. As of June 30 2007, the components and weights are Energy: 70.49%, Agriculture: 12.26%, Industrial Metal: 10.49%, Livestock: 4.59%, and Precious Metals: 2.18%.

Note: In order to nullify the effects of currency fluctuations on the underlying trends in the commodities market, Standard & Poor's uses the S&P GSCI™ US dollar series for making the commodities decision. However, S&P uses a synthetic commodity-linked equity basket that consists of the energy and materials sector indices of both the S&P 500 and the S&P Euro 350, using returns that are denominated in Euro (as available on Bloomberg) for performance metrics.

## **Data Used**

All returns (each, a “**Data Index**”) used for performance metrics are denominated in Euros.

### **U.S. Equity**

The S&P 500 (Bloomberg ticker: SPX Index).

### **European Equity**

The S&P Europe 350 (Bloomberg ticker: SPEURO Index).

### **Commodity-linked Equity Basket**

S&P 500 Energy Index (Bloomberg ticker: S5ENRS Index)

S&P 500 Materials Index (Bloomberg ticker: S5MATR Index)

S&P EU 350 Energy Index (Bloomberg ticker: SPEURO10 Index)

S&P EU 350 Materials Index (Bloomberg ticker: SPEURO15 Index).

From these four sector indices, we create a synthetic commodity-linked equity basket as follows: 25% S&P 500 Energy Index, 25% S&P EU 350 Energy Index, 25% S&P 500 Materials Index and 25% S&P EU 350 Materials Index.

The index is rebalanced to equal weighting at every semi-annual rebalancing date. As mentioned above, the indices are denominated in Euros.

### **Fixed Income**

IBOXX Euro Eurozone Sovereign Total Return 5-7 Years Index (Bloomberg ticker: QW1M Index).

### **Cash**

EONIA (Euro Overnight Index Average) Total Return Index (Bloomberg ticker: DBDCONIA Index).

## **Accepted Substitutions**

In the event that it becomes necessary to substitute any of the data indices used to calculate asset performances, the following data indices have been chosen in consideration of their market representation and liquidity factors:

### **U.S. Equity**

The Russell 1000 (Bloomberg ticker: RIY Index).

### **European Equity**

MSCI Europe Local Index (Bloomberg ticker: MSDLE15 Index).

**Commodity-linked Equity Basket**

MSCI USA/Energy Index (Bloomberg ticker: MXUS0EN Index)

MSCI USA/Materials Index (Bloomberg ticker: MXUS0MT Index)

MSCI Europe Energy Sector Local Index (Bloomberg ticker: MSRLNR Index)

MSCI Europe Materials Sector Index (Bloomberg ticker: MSRLMAT Index).

From these four sector indices, we create a synthetic commodity-linked equity basket as follows: 25% MSCI USA/Energy Index, 25% MSCI Europe Energy Sector Local Index, 25% MSCI USA/Materials Index and 25% MSCI Europe Materials Sector Index.

The index is rebalanced to equal weighting at every semi-annual rebalancing. As mentioned above, the indices are denominated in Euros.

**Fixed Income**

Lehman EuroAgg Treasury 5-7 Year Maturity Index (Bloomberg ticker: LET5MAT Index).

**Cash**

JPMorgan Cash Euro Currency 1 Month Index (Bloomberg ticker: JPCAEU1M Index).

## **Allocation Decision**

For the purposes of making allocation decisions, all Input Variables are in the native currency. This is to identify the underlying market trends prior to fluctuations caused by currency translations.

## **Individual Decisions**

Equities, Fixed Income, and Commodities are evaluated separately based on their own dynamics. The model applies a set of decision rules to the transformed inputs (the “**Decision Variable**”) to come up with one of three possible outcomes (bullish, bearish or neutral) for each of the three decisions (the “**Decisions**”).

## **Equity Decision**

### **Rationale Behind the Equity Decision Model**

Robust economic growth (as measured by GDP) is interpreted as a reason to invest in the equity markets. Strong consumer expenditures and strong consumer confidence are also considered positive indicators for corporate profits and, consequentially, positive equity returns.

Secular patterns are widely followed by the investment community and are incorporated in the decision process. Momentum strategies, tempered by relative valuation levels, are used to gauge whether the market will continue its short-term behavior or if it is about to reverse course.

The model assumes that all 6 Equity Decision Variables are equally important.

The model divides the equity allocation equally between U.S. Equity and European Equity. In effect, no relative judgment is made between the two regions.

Noting the fact that macroeconomic data are often revised, Standard & Poor's uses such data for the calculations presented below on an “as is” basis; i.e., S&P will use the latest available data and does not alter allocation decisions even though the data may be revised subsequently.

## **Calculations**

Economic Data Variables reference the most recent data available as of the Rebalancing Date, subject to the proviso that all comparisons between the U.S. and European economies are made over the same time period. In certain circumstances, this may result in the application of data on a lagged basis to ensure that observation periods are consistent.

Market Data Variables reference the last Scheduled Trading Day of the preceding calendar month.

Using the Input Variables, Standard & Poor's performs intermediate calculations, before creating Equity Decision Variables, as follows:

### Equity Intermediate Calculations

**European G.D.P.** Calculate the 12-month change using the following formula:

$$\left( \frac{EUGDP_t}{EUGDP_{t-12}} \right) - 1,$$

where  $EUGDP_t$  = European GDP at the Reference Date

**U.S. GDP.** Use as is.

**European and U.S. Consumer Consumption.** Calculate the 3-month change using the following formula:

$$\left( \frac{CCN_t}{CCN_{t-3}} \right) - 1,$$

where  $CCN_t$  = the relevant Consumer Consumption at Reference Date

**European and U.S. Consumer Confidence.** Calculate the 6-month change using the following formula:

$$\left( \frac{CCF_t}{CCF_{t-6}} \right) - 1,$$

where  $CCF_t$  = the relevant Consumer Confidence at Reference Date

**European and U.S. P/E Valuation.** Calculate the ratio of current level to that of the average level over the last 7-months in accordance with the following formula:

$$\left( \frac{P/E_t}{1/7 * (P/E_t + P/E_{t-1} + P/E_{t-2} + P/E_{t-3} + P/E_{t-4} + P/E_{t-5} + P/E_{t-6})} \right)$$

where  $P/E_t$  = the relevant P/E at the Reference Date

### European and U.S. Equity Return.

**S&P 500:** Calculate the 3-month return using the following formula:

$$\left( \frac{SP500_t}{SP500_{t-3}} \right) - 1,$$

where  $SP500_t$  = the S&P 500 Price Return Index at the Reference Date

Calculate the 6-month return using the following formula:

$$\left( \frac{SP500_t}{SP500_{t-6}} \right) - 1,$$

where  $SP500_t$  = the S&P 500 Price Return Index at the Reference Date

**S&P Euro 350:** Calculate the 3-month return using the following formula:

$$\left( \frac{SPE350_t}{SPE350_{t-3}} \right) - 1,$$

where  $SPE350_t$  = the S&P Europe 350 Price Return Index at the Reference Date

Calculate the 6-month return using the following formula:

$$\left( \frac{SPE350_t}{SPE350_{t-6}} \right) - 1,$$

where  $SPE350_t$  = the S&P Europe 350 Price Return Index at the Reference Date

### **Create Equity Decision Variables**

**GDP Decision Variable.** Select the smaller of the European GDP or the U.S. GDP to be the GDP Decision Variable.

**Consumer Consumption Decision Variable.** Select the smaller of the European Consumer Consumption 3-month change or the U.S. Consumer Consumption 3-month change as the Consumer Consumption Decision Variable.

**Consumer Confidence Decision Variable.** Select the smaller of the European Consumer Confidence 6-month change or the U.S. Consumer Confidence 6-month change as the Consumer Confidence Decision Variable.

**P/E Valuation Decision Variable.** Select the higher of the ratio of current level to the 7-month moving average of the European or the U.S. P/E Valuations to be the P/E Valuation Decision Variable.

**3-Month Equity Return Decision Variable.** Select the smaller of the 3-month return of the S&P 500 or the S&P Euro 350 as the 3-Month Equity Return Decision Variable.

**6-Month Equity Return Decision Variable:** Select the smaller of the 6-month return of the S&P 500 or the S&P Euro 350 as the 6-Month Equity Return Decision Variable.

### **Designate Upper and Lower Thresholds of the Decision Variables**

<b>Decision Variable</b>	<b>Upper Threshold</b>	<b>Lower Threshold</b>
GDP	3.5%	1.25%
Consumer Consumption	1.2%	0.9%
Consumer Confidence	5%	-5%
P/E Valuation	1.05	0.95
3-Month Equity Return	3.5%	0%
Six-Month Equity Return	5%	1%

### **Scoring System for Equity Decision Variables**

For the GDP, Consumer Consumption, Consumer Confidence, 3-Month Equity Return, and 6-Month Equity Return Decision Variables:

<b>Decision Variable</b>	<b>Outlook</b>	<b>Score</b>
Greater than or equal to the Upper Threshold	bullish	+1
Less than or equal to the Lower Threshold	bearish	-1
Between the Upper and Lower Thresholds	neutral	0

For the P/E Valuation Decision Variable:

<b>Decision Variable</b>	<b>Outlook</b>	<b>Score</b>
Greater than or equal to the Upper Threshold	bearish	-1
Less than or equal to the Lower Threshold	bullish	+1
Between the Upper and Lower Thresholds	neutral	0

All the scores are then added together to give a total score for the Equity Decision Variables.

### **Decision Rule for the Equity Decision**

<b>Score Totals</b>	<b>Equity Decision</b>
Greater than or equal to 4	bullish
Between the -4 and 4	neutral
Less than or equal to -4	bearish

## **Fixed Income Decision**

### **Rationale Behind the Fixed Income Model**

An improving economy, accelerating inflation, and rate hikes generally make fixed income investments less attractive. In contrast, a weakening economy, a stable inflation outlook and interest rate cuts by the central bank tend to buoy bond prices. The model assumes that these three Decision Variables are equally important.

Standard & Poor's looks only at European fixed income in this model and, thus, only considers European GDP, European inflation, and European interest rates. All of these data series are denominated in Euros.

### **Calculations**

Economic Data Variables reference the most recent data available as of the Rebalancing Date, subject to the proviso that all comparisons between the U.S. and European economies are made over the same time period. In certain circumstances this may result in the application of data on a lagged basis to ensure that observation periods are consistent.

Market Data Variables reference the last Schedule Trading Day of the preceding calendar month

Using the Input Variables, Standard & Poor's performs intermediate calculations, before creating Equity Decision Variables, as follows:

### **Fixed Income Intermediate calculations**

**European G.D.P.** Calculate the 12-month change using the following formula:

$$\left( \frac{EUGDP_t}{EUGDP_{t-12}} \right) - 1,$$

where  $EUGDP_t$  = European GDP at the Reference Date

**European Inflation.** Use as is.

**European Interest Rates:** Calculate the one-month change using the following formula:

$$EIRR_t - EIRR_{t-1},$$

where  $EIRR_t$  = European Interest Rate at the Reference Date

### **Create Fixed Income Decision Variables**

**European GDP Decision Variable.** Use the 12-month change in European GDP as the European GDP Decision Variable

**European Inflation Decision Variable.** Use as is.

**European Interest Rates Decision Variable.** Use the one-month change in the Interest Rates as the Interest Rates Decision Variable.

### **Designate Upper and Lower Thresholds of the Decision Variables:**

<b>Decision Variable</b>	<b>Upper Threshold</b>	<b>Lower Threshold</b>
European GDP	3.5%	2.0%
European Inflation	2.25%	1.5%
European Interest Rate	0.25%	-0.25%

### **Scoring System for Fixed Income Decision Variables**

<b>Decision Variable</b>	<b>Outlook</b>	<b>Score</b>
Greater than or equal to the Upper Threshold	bearish	-1
Less than or equal to the Lower Threshold	bullish	+1
Between the Upper and Lower Thresholds	neutral	0

All the scores are then added together to give a total score for the Fixed Income Decision Variables.

### **Decision Rule for the Fixed Income Decision**

<b>Score Totals</b>	<b>Equity Decision</b>
Greater than or equal to 1	bullish
Between the -1 and 1	neutral
Less than or equal to -1	bearish

### **Commodities Decision**

#### **Rationale Behind the Commodities Decision Model**

Technical indicators are a major factor in the commodities market, outside of market fundamentals such as supply and demand. Tracking the 3-month, 6-month, and 9-month returns give a sense of the overall direction of the market and its potential turning points.

#### **Calculations**

Market Data Variables reference the last Scheduled Trading Day of the preceding calendar month

Using the Input Variables, Standard & Poor's performs intermediate calculations, before we create Commodities Decision Variables, as follows:

### **Commodities Intermediate Calculations**

#### **S&P GSCI™ Excess Return Index**

Calculate the 3-month return using the following formula:

$$\left( \frac{SPGCSI_t}{SPGSCI_{t-3}} \right) - 1,$$

where  $SPGSCI_t$  = the S&P GSCI Excess Return Index at the Reference Date

Calculate the 6-month return using the following formula:

$$\left( \frac{SPGCSI_t}{SPGSCI_{t-6}} \right) - 1,$$

where  $SPGSCI_t$  = the S&P GSCI Excess Return Index at the Reference Date

Calculate the 9-month return using the following formula:

$$\left( \frac{SPGCSI_t}{SPGSCI_{t-9}} \right) - 1,$$

where  $SPGSCI_t$  = the S&P GSCI Excess Return Index at the Reference Date

### **Create Commodities Decision Variables**

**3-month S&P GSCI™ Excess Return Decision Variable.** Use the 3-month return of the S&P GSCI™ Excess Return Index as the 3-Month S&P GSCI™ Decision Variable.

**6-month S&P GSCI™ Excess Return Decision Variable.** Use the 6-month return of the S&P GSCI™ Excess Return Index as the 6-Month S&P GSCI™ Decision Variable.

**9-month S&P GSCI™ Excess Return Decision Variable.** Use the 9-month return of the S&P GSCI™ Excess Return Index as the 9-Month S&P GSCI™ Decision Variable.

**Designate Upper and Lower Thresholds for the Decision Variables:**

<b>Decision Variable</b>	<b>Upper Threshold</b>	<b>Lower Threshold</b>
3-month S&P GSCI™ Excess Return	0%	0%
6-month S&P GSCI™ Excess Return	0%	0%
6-month S&P GSCI™ Excess Return	0%	0%

**Scoring System for Commodities Decision Variables**

The two-part rule, listed below, is evaluated in sequence, i.e., if (a) is true, then (b) is bypassed, and if (a) is not true, then (b) is executed. Standard & Poor's is trying to identify upside turning points in the commodities market. If such turning points are not present at the time, then the focus is on short-term market conditions to determine the trend in the market.

- a) If the 6-month S&P GSCI™ Excess Return Decision Variable is greater than or equal to 30%, and the 9-month S&P GSCI™ Excess Return Decision Variable is at least twice as large as the 6-month S&P GSCI™ Excess Return Decision Variable, the Commodities Decision Variable is bearish, and is given a score of -1.
- b) If both the 3-month S&P GSCI™ Excess Return Decision Variable and the 6-month S&P GSCI™ Excess Return Decision Variable are greater than their Upper Thresholds, the Commodities Decision Variable is bullish and is given a score of +1. If both the 3 Month S&P GSCI™ Excess Return Decision Variable and the 6-Month S&P GSCI™ Excess Return Decision Variable are less than their Lower Thresholds, the Commodities Decision Variable is bearish and is given a score of -1. Otherwise, the Commodities Decision Variable is neutral and is given a score of 0.

**Decision Rule for the Commodities Decision**

<b>Score Totals</b>	<b>Equity Decision</b>
Greater than or equal to 1	bullish
Between the -1 and 1	neutral
Less than or equal to -1	bearish

## Combining the Individual Decisions

For each Decision, there are three possible outcomes: bullish, neutral or bearish. Hence, the theoretical number of different combinations of these three decision outcomes is 27. Such combinations are displayed as different nodes of a decision tree, as follows:

The decision tree:

Decision Node	Equity Decision	Commodity Decision	Fixed Income Decision
A	bearish	bearish	bearish
B	bearish	bearish	neutral
C	bearish	bearish	bullish
D	bearish	neutral	bearish
E	bearish	neutral	neutral
F	bearish	neutral	bullish
G	bearish	bullish	bearish
H	bearish	bullish	neutral
I	bearish	bullish	bullish
J	neutral	bearish	bearish
K	neutral	bearish	neutral
L	neutral	bearish	bullish
M	neutral	neutral	bearish
N	neutral	neutral	neutral
O	neutral	neutral	bullish
P	neutral	bullish	bearish
Q	neutral	bullish	neutral
R	neutral	bullish	bullish
S	bullish	bearish	bearish
T	bullish	bearish	neutral
U	bullish	bearish	bullish
V	bullish	neutral	bearish
W	bullish	neutral	neutral
X	bullish	neutral	bullish
Y	bullish	bullish	bearish
Z	bullish	bullish	neutral
AA	bullish	bullish	bullish

Each theoretical outcome is matched with a pre-designed Asset Class Mix. The key to selecting the appropriate asset allocation strategy is based on the bearish/neutral/bullish signals of each of the three Decisions.

## Asset Allocation Strategies

Asset Allocation Strategy Number	Equity Decision	Commodity Decision	Fixed Income Decision
1	underweight	underweight	underweight
2	underweight	neutral	underweight
3	underweight	overweight	underweight
4	neutral	underweight	underweight
5	neutral	neutral	underweight
6	neutral	overweight	underweight
7	overweight	underweight	underweight
8	overweight	neutral	underweight
9	overweight	overweight	underweight
10	underweight	underweight	neutral
11	underweight	neutral	neutral
12	underweight	overweight	neutral
13	neutral	underweight	neutral
14	neutral	neutral	neutral
15	neutral	overweight	neutral
16	overweight	underweight	neutral
17	overweight	neutral	neutral
18	overweight	overweight	neutral
19	underweight	underweight	overweight
20	underweight	neutral	overweight
21	underweight	overweight	overweight
22	neutral	underweight	overweight
23	neutral	neutral	overweight
24	neutral	overweight	overweight
25	overweight	underweight	overweight
26	overweight	neutral	overweight
27	overweight	overweight	overweight

As previously defined, the Asset Classes used to construct the portfolio are represented by the following index series, all of which are denominated in Euros:

- Equity
  - Europe: S&P Euro 350 (Bloomberg ticker: SPEURO Index)
  - US: S&P 500 (Bloomberg ticker: SPX Index)
- Commodities – a synthetic commodity-linked equity basket (Bloomberg tickers for the underlying indices: S5ENRS Index, S5MATR Index, SPEURO10 Index, SPEURO15 Index)
- Fixed Income – IBOXX Eurozone Sovereign 5-to-7 years Index (Bloomberg ticker: QW1M Index)
- Cash – EONIA Total Return Index (Bloomberg ticker: DBDCONIA Index)

## Asset Class Mix

Asset Allocation Strategy Number	European Equity	U.S. Equity	Commodity-linked Equity Basket	Fixed Income	Cash
1	12.5	12.5	3.0	36.750	35.250
2	12.5	12.5	12.0	32.250	30.750
3	12.5	12.5	18.0	27.750	29.250
4	25.0	25.0	3.0	25.500	21.50
5	25.0	25.0	12.0	21.000	17.000
6	25.0	25.0	18.0	16.500	15.500
7	37.5	37.5	3.0	14.250	7.750
8	37.5	37.5	12.0	9.750	3.250
9	37.5	37.5	18.0	5.250	1.750
10	12.5	12.5	3.0	42.875	29.125
11	12.5	12.5	12.0	37.625	25.375
12	12.5	12.5	18.0	32.375	24.625
13	25.0	25.0	3.0	29.750	17.250
14	25.0	25.0	12.0	24.500	13.500
15	25.0	25.0	18.0	19.250	12.750
16	37.5	37.5	3.0	16.625	5.375
17	37.5	37.5	12.0	11.375	1.625
18	37.5	37.5	18.0	6.125	0.875
19	12.5	12.5	3.0	49.000	23.000
20	12.5	12.5	12.0	43.000	20.000
21	12.5	12.5	18.0	37.000	20.000
22	25.0	25.0	3.0	34.000	13.000
23	25.0	25.0	12.0	28.000	10.000
24	25.0	25.0	18.0	22.000	10.000
25	37.5	37.5	3.0	19.000	3.000
26	37.5	37.5	12.0	13.000	0.000
27	37.5	37.5	18.0	7.000	0.000

The Asset Class Mix of each of the asset allocation strategies reflects the nature of the decision outcomes.

## Guideline for Construction

In general, Standard & Poor's is developing a set of asset allocation portfolios that dynamically change as macroeconomic and market conditions change. However, there is a simultaneous goal to minimize downside risk when the outlook is bearish or neutral. Thus, the baseline allocations for Equity and Commodity exposures are as follows:

- Equity: 75% (Bullish), 60% (Neutral), and 45% (Bearish)
- Commodity-linked equity basket: 18% (Bullish), 12% (Neutral), and 6% (Bearish)

Once Standard & Poor's has decided on the Equity and Commodity allocations, the Fixed Income exposure is equal to (100% -  $\Sigma$  Equity and Commodity allocations).

Standard & Poor's, then, applies the risk minimization guideline to the initial Equity and Commodity exposures by defensively moving some of the initial allocations into Cash, as follows:

- **Equity** – The equity investment shall always be weighted equally between Europe and the U.S. Total equity exposure can either be 75% (Overweight), 50% (Neutral) or 25% (Underweight). Thus, we reduce the initial equity allocations as follows:
  - Allocate 20% to cash, if the Equity outlook is bearish, or
  - Allocate 10% to cash if the Equity outlook is neutral
- **Commodities** - Total commodities exposure, as represented by a synthetic commodity-linked equity basket, can either be 18% (Overweight), 12% (Neutral) or 3% (Underweight). Thus, we reduce the initial Commodity allocations as follows:
  - Allocate 3% to cash, if the Commodities outlook is bearish
- **Fixed Income** - The combined fixed income and cash allocation is equal to 100% minus the sum of the Equity and Commodities allocations. In addition, allocate a portion of the Fixed Income allocation to Cash as follows:
  - One-fourth of the initial Fixed Income allocation if the Fixed Income outlook is bearish, or
  - One-eighth of the initial Fixed Income allocation if the Fixed Income outlook is neutral.
- **Cash** – The sum of all cash allocations determined from each of the Equity, Commodities, and Fixed Income Decisions above.

### Calculation Algorithm

The daily calculation of the SPDMAS on any Scheduled Trading Day,  $t$ , within the relevant five-day Asset Allocation Period is as follows:

$$SPDMAS_t = SPDMA_{Last\ Rebalancing\ Date} \times \sum_{i=1}^5 \left( Weight^i \times \frac{Data\ Index\ Level_t^i}{Data\ Index\ Level_{Last\ Rebalancing\ Date}^i} \right)$$

Where:

“**Data Index Level<sup>i</sup><sub>Last Rebalancing Date</sub>**” means the Data Index Level of the relevant Data Index,  $i$ , on the Last Rebalancing Date;

“**Data Index Level<sup>i</sup><sub>t</sub>**” means the Data Index Level of the relevant Data Index,  $i$ , on the relevant Scheduled Trading Day,  $t$ ;

“**Last Rebalancing Date**” means, in relation to the relevant Scheduled Trading Day, the business day immediately preceding the new First Rebalancing Date within the five-day Asset Allocation Period;

“**SPDMA<sub>Last Rebalancing Date</sub>**” means the official closing level of the SPDMA at the Last Rebalancing Date; and

“**Weight<sup>i</sup>**” means the weighting of the relevant Asset Class<sup>i</sup> as determined for the relevant Asset Allocation Period.

# Index Maintenance

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## Frequency

The Index is rebalanced twice a year, in February and August. The Asset Class Mix is updated with all Input Variables available as of the relevant rebalancing Reference Date – February 10 and August 10, respectively. The Input Variables used are ‘as is’ and do not undergo any future revisions, even if the relevant reporting agencies revise the data at future dates.

## Rebalancing

To facilitate the creation of derivatives and structured products based on the SPDMAS, the rebalancing takes place during a five-day Rebalancing Period. This five-day period typically begins five business days after the respective rebalancing reference date.

On each Rebalancing Date during the relevant Rebalancing Period, one-fifth of the change in the Asset Class Mix, as determined at the Reference Date takes effect, if any such change exists.

With respect to a Reference Date, the new Asset Class Mix will take full effect on the Final Rebalancing Date immediately following such Reference Date, typically 10 business days following the respective Reference Date.

The calculation of the SPDMAS on a Scheduled Trading Day,  $t$ , being a Rebalancing Date is as follows:

1. With respect to the First Rebalancing Date<sub>k=1</sub>, being the Rebalancing Period Commencement Date

$$SPDMAS_t = SPDMA_{Last\ Rebalancing\ Date} \times \sum_{i=1}^5 \left( Weight^i \times \frac{Data\ Index\ Level_t^i}{Data\ Index\ Level_{Last\ Rebalancing\ Date}^i} \right)$$

Where:

“**Data Index Level**<sub>Last Rebalancing Date</sub> <sup>$i$</sup> ” means the Data Index Level of the relevant Data Index,  $i$ , on the Last Rebalancing Date;

“**Data Index Level** <sub>$t$</sub>  <sup>$i$</sup> ” means the Data Index Level of the relevant Data Index,  $i$ , on the relevant Scheduled Trading Day,  $t$ ;

“**Last Rebalancing Date**” means, in relation to the relevant Scheduled Trading Day<sub>t</sub>, the business day immediately preceding the new First Rebalancing Date within the five-day Asset Allocation Period;

“**SPDMAS<sub>Last Rebalancing Date</sub>**” means the official closing level of the SPDMAS on the Last Rebalancing Date; and

“**Weight<sup>i</sup>**” means the weighting of the relevant Asset Class<sup>i</sup> as determined for the preceding Asset Allocation Period.

2. For the second thru sixth Rebalancing Dates<sub>k</sub> (k=2,3,4,5,6)

$$SPDMAS_t = SPDMAS_{t-1} \times \sum_{i=1}^5 \left( Weight_k^i \times \frac{Data\ Index\ Level_t^i}{Data\ Index\ Level_{t-1}^i} \right)$$

Where:

“**Data Index Level<sup>i</sup><sub>Last Rebalancing Date</sub>**” means the Data Index Level of the relevant Data Index, *i*, on the Last Rebalancing Date;

“**Data Index Level<sup>i</sup><sub>t</sub>**” means the Data Index Level of the relevant Data Index, *i*, on the relevant Scheduled Trading Day, *t*;

“**Data Index Level<sup>i</sup><sub>t-1</sub>**” means the Data Index Level of the relevant Data Index, *i*, on the relevant Scheduled Trading Day, *t-1*;

“**Data Index Level<sup>i</sup><sub>k-1</sub>**” means the Data Index Level of the relevant Data Index, *i*, on the First Rebalancing Date;

“**Effective Weight<sup>i</sup>**” means a percentage of such Asset Class<sup>i</sup> as determined by the following formula:

$$Effective\ Weight^i = Weight^i * \frac{\frac{Data\ Index\ Level_{k=1}^i}{Data\ Index\ Level_{Last\ Rebalancing\ Date}^i}}{SPDMAS_{k=1}} \div SPDMAS_{Last\ Rebalancing\ Date}$$

“**Last Rebalancing Date**” means, in relation to the relevant Scheduled Trading Day<sub>t</sub>, the business day immediately preceding the new First Rebalancing Date within the five-day Asset Allocation Period;

“**SPDMAS<sub>k=1</sub>**” means the official closing level of the SPDMAS on the First Rebalancing Date;

“**SPDMAS<sub>Last Rebalancing Date</sub>**” means the official closing level of the SPDMAS on the Last Rebalancing Date;

“**SPDMAS<sub>t-1</sub>**” means the official closing level of the SPDMAS on the relevant Scheduled Trading Day,  $t-1$ ;

“**Weight<sub>k</sub><sup>i</sup>**” means, in relation to the relevant Rebalancing Date<sub>k</sub>, the weighting of the relevant Asset Class<sup>i</sup>, as linearly interpolated between the Effective Weight<sup>i</sup> of such Asset Class<sup>i</sup>, compiled on the First Rebalancing Date ( $k=1$ ), and the Weight<sup>i</sup> of such Asset Class<sup>i</sup> derived on the respective Reference Date for the following Asset Allocation Period;

“**Weight<sup>i</sup>**” means the weighting of the relevant Asset Class<sup>i</sup> as determined for the prior Asset Allocation Period.

If any Rebalancing Date is a Disrupted Day, in relation to a Data Index (the “**Affected Data Index**”), then the Rebalancing Date for all the Data Indices shall be the first succeeding Scheduled Trading Day that is not a Disrupted Day for any Data Index, unless there is a Disrupted Day with respect to any Data Index on each of the eight Scheduled Trading Days immediately following the date that, but for the occurrence of a Disrupted Day, would have been the relevant Rebalancing Date. In that case:

- i. That eighth following Scheduled Trading Day shall be deemed to be the Rebalancing Date with respect to all of the Data Indices, notwithstanding it is a Disrupted Day (the “**Deemed Rebalancing Date**”); and
- ii. With respect to any Data Index which is not an Affected Data Index on the Deemed Rebalancing Date, the Data Index Level for the Data Index shall be such Data Index Level; and
- iii. With respect to any Data Index which is an Affected Data Index on the Deemed Rebalancing Date, Standard & Poor’s shall determine its good faith estimate of the level of such Affected Data Index for that day notwithstanding the fact that such day is a Disrupted Day.

# Index Dissemination

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SPDMAS values are disseminated daily, both in Euros and in U.S. Dollars, on any Scheduled Trading Day, unless such day is a Data Index Disrupted Day.

In the event that any Scheduled Trading Day is a Data Index Disrupted Day, a daily index value for the SPDMAS is still calculated and disseminated if any Data Indices representing at least 80% of the relevant Asset Class Mix are available on such day. In such a case, Standard & Poor's calculates the value of the SPDMAS by using the Data Index Levels of such Data Indices on such Scheduled Trading Day and, in relation to the Affected Data Indices, the Data Index Levels of such Affected Data Indices as of the immediately preceding Scheduled Trading Day.

*Price Return Values in U.S. Dollars and Euros are disseminated on a daily basis on Standard & Poor's Web site at <http://www.indices.standardandpoors.com> and through third-party data vendors.*

## **Tickers**

<b>Index</b>	<b>Bloomberg</b>
S&P Dynamic Multi-Asset Strategy Index (Price Return) in Euros	SPDMAS
S&P Dynamic Multi-Asset Strategy Index (Price Return) in U.S. Dollars	SPDMASUS

# Appendix

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## Defined Terms

**“Asset Allocation Period”** means each period beginning, but excluding, the prior period’s Final Rebalancing Date up-to-and-including the following Rebalancing Period Commencement Date. Effectively, it is the time period that includes all days except the five-day Rebalancing Period;

**“Data Index”** means each of the S&P Indices, the IBOXX Euro Eurozone Sovereign Total Return 5-7 Years Index and the EONIA Total Return Index (together, the **“Data Indices”**);

**“Data Index Disrupted Day”** means any Scheduled Trading Day on which:

- (i) an Index Sponsor fails to calculate and/or announce an Index level;
- (ii) a Related Exchange fails to open for trading during its regular trading session, in the case of S&P Indices; or
- (iii) a Market Disruption Event has occurred;

**“Data Index Level”** means, in relation to any Scheduled Trading Day and any Data Index:

- (i) In relation to any S&P Data Index: the relevant Index level at the Valuation Time on such Scheduled Trading Day; and
- (ii) In relation to the IBOXX Euro Eurozone Sovereign Total Return 5-7 Years Index and the EONIA Total Return Index, the official closing level of such Data Index on such Scheduled Trading Day, as published by the relevant Index Sponsor;

**“Early Closure”** means, with respect to any S&P Data Index, the closure on any Exchange Business Day of the Exchange with respect to any Component Security or the Related Exchange prior to its Scheduled Closing Time, unless such earlier closing is announced by such Exchange, or Related Exchange, at least one hour prior to the earlier of: (i) the actual closing time for the regular trading session on such Exchange, or Related Exchange, on such Exchange Business Day; or (ii) the submission deadline for orders to be entered into the Exchange or Related Exchange system for execution at the relevant Valuation Time on such Exchange Business Day;

**“Economic Data Variables”** means the following Input Variables -- European and U.S. GDP, European and U.S. Consumer Consumption, European and U.S. Consumer Confidence, European Inflation, and European and U.S. P/E ratios.

**“Exchange”** means, in relation to each security comprised in any S&P Data Index (a **“Component Security”**), the principal stock exchange on which such Component Security is principally traded, as determined by Standard & Poor's;

**“Exchange Business Day”** means, with respect to any S&P Data Index, any Scheduled Trading Day on which: (i) the Standard & Poor's publishes the level of the relevant S&P Data Index; and (ii) the Related Exchange is open for trading during its regular trading session, notwithstanding the Related Exchange closing prior to its Scheduled Closing Time;

**“Exchange Disruption”** means, with respect to any S&P Data Index, any event (other than an Early Closure) that disrupts or impairs (as determined by Standard & Poor's) the ability of market participants, in general, to effect transactions in, or obtain market values for: (i) any Component Security on the Exchange with respect to such Component Security; or (ii) futures or options contracts relating to the relevant S&P Data Index on the Related Exchange;

**“Final Rebalancing Date”** means the last Scheduled Trading Day in each Rebalancing Period;

**“Index Sponsor”** means:

- (i) With respect to each S&P Data Index: Standard & Poor's;
- (ii) With respect to the IBOXX Euro Eurozone Sovereign Total Return 5-7 Years Index, the International Index Company Limited; and
- (iii) With respect to the EONIA Total Return Index: the ECB;

**“Input Variable”** means each individual Input Variable listed in the Input Variables section;

**“Input Variable Level”** means, in relation to any Reference Date and any Input Variable, the level of such Input Variable on such Reference Rate, as published by Bloomberg and as determined by Standard & Poor's;

**“Market Data Variables”** means the following Input Variables – the S&P 500, the S&P Euro 350, European Interest Rates, and the S&P GSCI™ Excess Return Index

**“Market Disruption Event”** means, with respect to any Data Index:

- (i) The occurrence or existence, with respect to any Component Security, of:
  1. A Trading Disruption,
  2. An Exchange Disruption,in either case, which the relevant Index Sponsor determines is material, at any time during the one-hour period that ends at the relevant Valuation Time with respect to the Exchange on which such Component Security is principally traded; OR
3. An Early Closure with respect to such Component Security; AND

- (ii) The aggregate of all Component Securities, with respect to which a Trading Disruption, an Exchange Disruption or an Early Closure occurs or exists, comprises 20% or more of the weight of the relevant Data Index; OR
- (iii) The occurrence or existence, with respect to futures or options contracts relating to the relevant Data Index, of: (a) a Trading Disruption; (b) an Exchange Disruption, which in either case the relevant Index Sponsor determines is material, at any time during the one hour period that ends at the Valuation Time with respect to the Related Exchange; or (c) an Exchange Disruption with respect to such futures or options contracts.

For the purposes of determining that a Market Disruption Event exists with respect to a Component Security at any time, the relevant percentage contribution of that Component Security to the level of the relevant Data Index shall be based on a comparison of (a) the portion of the level of such Data Index attributable to that Component Security to (b) the overall level of such Data Index, in each case immediately before that suspension or limitation;

**“Rebalancing Date”** means each Scheduled Trading Day in any Rebalancing Period;

**“Rebalancing Period”** means the period of six Scheduled Trading Days beginning with and including each Rebalancing Period Commencement Date;

**“Rebalancing Period Commencement Date”** means, in relation to each Reference Date, the day which is the fifth Scheduled Trading Day immediately following such Reference Date;

**“Reference Date”** means February and August 10<sup>th</sup> of each year, or, if such day is not a Scheduled Trading Day, the next following Scheduled Trading Day;

**“Related Exchange”** means, in relation to each S&P Data Index, each exchange or quotation system where trading has a material impact (as determined by Standard & Poor's) on the overall market for futures and options contracts relating to such S&P Data Index;

**“S&P Data Index”** means each of the S&P 500, the S&P Europe 350, the S&P 500 Energy, the S&P 500 Materials, the S&P EU 350 Energy and the S&P EU 350 Materials Indices (together, the **“S&P Data Indices”**);

**“Scheduled Closing Time”** means, with respect to a relevant Exchange or Related Exchange and a Scheduled Trading Day, the scheduled business day closing time of such Exchange or Related Exchange on such Scheduled Trading Day, without regard to after hours or any other trading outside of the regular trading session hours;

**“Scheduled Trading Day”** means a day in which:

- (i) With respect to each S&P Data Index: (a) Standard & Poor's publishes the level of the relevant Index; and (b) the relevant Related Exchange is open for trading during its regular trading session, notwithstanding the relevant Exchange or Related Exchange closing prior to its Scheduled Closing Time;
- (ii) With respect to the IBOXX Euro Eurozone Sovereign Total Return 5-7 Years Index: the relevant Index Sponsor is scheduled to publish the level of the such Index;
- (iii) With respect to the EONIA Total Return Index: a TARGET Settlement Day;

**“TARGET Settlement Day”** means a day on which the TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system) is open;

**“Trading Disruption”** means

- with respect to any S&P Data Index, any suspension of or limitation imposed on trading by the relevant Exchange or Related Exchange, or otherwise, and
- whether by reason of movements in price exceeding limits permitted by the relevant Exchange or Related Exchange, or otherwise:
  - (i) relating to any Component Security on the Exchange; or
  - (ii) in futures or options contracts relating to the relevant S&P Data Index on the Related Exchange;

**“Valuation Time”** means, in relation to any S&P Data Index,

- for the purposes of determining whether a Market Disruption Event has occurred:
  - (i) with respect to any Component Security, the Scheduled Closing Time on the Exchange, and
  - (ii) with respect to any futures or options contracts on the relevant S&P Data Index, the close of trading on the Related Exchange; and
- in all other circumstances, the time at which the official closing level of the Index is calculated and published by Standard & Poor's.

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# Disclaimer

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The source of the IBOXX index data is - International Index Company  
The source for EONIA is - Deutsche Banc Alex Brown

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