S&P 500 LinkUp Jobs Indices

Methodology

March 2019
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Introduction

Index Objective and Highlights

The S&P 500 LinkUp Jobs Indices measure the global open jobs listings posted by companies in the S&P 500, including all subsidiaries as determined by LinkUp. The weekly publication of the index value is intended for use as an economic indicator.


Index Family

Headline Index:
  - S&P 500 LinkUp Jobs Index

Sector Indices: Sector classification is based on GICS.
  - S&P 500 LinkUp Jobs Energy Index (Sector)
  - S&P 500 LinkUp Jobs Materials Index (Sector)
  - S&P 500 LinkUp Jobs Industrials Index (Sector)
  - S&P 500 LinkUp Jobs Consumer Discretionary Index (Sector)
  - S&P 500 LinkUp Jobs Consumer Staples Index (Sector)
  - S&P 500 LinkUp Jobs Health Care Index (Sector)
  - S&P 500 LinkUp Jobs Financials Index (Sector)
  - S&P 500 LinkUp Jobs Information Technology Index (Sector)
  - S&P 500 LinkUp Jobs Communication Services Index (Sector)
  - S&P 500 LinkUp Jobs Utilities Index (Sector)
  - S&P 500 LinkUp Jobs Real Estate Index (Sector)

Partnership

The development of the S&P 500 LinkUp Jobs Indices is the result of a collaboration between S&P Dow Jones Indices LLC and JobDig Inc., the parent company of LinkUp. LinkUp’s primary role is providing S&P Dow Jones Indices with the global open job postings in connection to the constituents of the S&P 500 and its subsidiaries.

LinkUp is a data-driven job search company tracking job openings sourced directly from employer websites. LinkUp aggregates (“scraps”) data on a daily basis directly from employer websites to track over 3.9 million jobs from over 50,000 companies.

For more information on LinkUp’s proprietary technology framework, methodology, and analytics, please refer to LinkUp’s website at https://www.linkup.com/.
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:

<table>
<thead>
<tr>
<th>Supporting Document</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P Dow Jones Indices’ Index Mathematics Methodology</td>
<td>Index Mathematics Methodology</td>
</tr>
<tr>
<td>S&amp;P Dow Jones Indices’ Global Industry Classification Standard (GICS) Methodology</td>
<td>GICS Methodology</td>
</tr>
</tbody>
</table>

This methodology was created by S&P Dow Jones Indices to achieve the aforementioned objective of the index. 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 and Index Construction

Index Eligibility

Index compositions are derived from the constituents of the S&P 500. All constituents of the S&P 500 that have been a member of the index for at least 30 days are included in the S&P 500 LinkUp Jobs Indices.

Multiple Share Classes

Each company is represented once by the primary listing, which is generally the most liquid share line. In addition, for cases where both a parent company and a subsidiary are constituents of the S&P 500, only the parent will be represented in the index, but the total job count is the combination of the sum of the parent’s and all subsidiaries’ total open job listings.

Data Submission Process

LinkUp delivers open jobs posting data for the indices to S&P Dow Jones Indices on a daily basis, with a lag of seven calendar days. The calculation date (weekly on Mondays) consists of the open jobs data for the prior Monday through Sunday period.

A particular day’s job count for a company is excluded if it exceeds three standard deviations from the 90-day rolling average for that particular company. If there are less than 90 days available a minimum of a 30 day range is used.

In the case of a failed 90-day quality assurance check, a new average and standard deviation are calculated starting on the day of the failure. If the component’s job count has not returned to within the previous bands for 14 days, the new mean and standard deviation are used instead. Once the component either returns to within its previous bands or is within its new 14 day bands, it will be included again.

If a constituent’s jobs data exceeds the threshold for the entire week of the current period, the constituent will be treated as a deletion and a divisor adjustment will be implemented.

In addition, if a single day’s job count is zero, it is not considered. These data exclusions are incorporated to manage events such as website redesigns or maintenance which may return erroneous open jobs data.

The Current Period is the seven-day period beginning 16 days before the publication date (weekly on Wednesdays) and ending 10 days before the delivery date. The period of seven days between Day 8 and Day 14 is the “Lag Period.”

<table>
<thead>
<tr>
<th>Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
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<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>

7 Day Lag
Jobs data averaged between Day 1 and Day 7

Index Calculation Date *

Index Publication Date

* The index level is calculated on the 15th day using the open composition of the S&P 500 Index on the 8th day.
Constituent Weightings

Constituents are weighted by their respective open job postings for the calculation week relative to the total open job postings in the same time period for the index universe.

Index Calculation

The calculation process is as follows:

1. The sum of the weekly average of each constituent and its subsidiaries’ open jobs count.
2. If there is a constituent change, such as an addition or deletion to/from the S&P 500, the divisor will be adjusted to offset and normalize the change in total open job postings of the S&P 500 LinkUp Index to provide a continuous index measure.

The formula used to calculate the index is:

\[
\text{Index} = \frac{\sum Qi}{\text{Divisor}}
\]

where:

\( Qi \) = the average weekly open job posting of the \( i^{th} \) company.

Index Divisor

The table below summarizes the index maintenance adjustments and indicates when a divisor adjustment is required:

<table>
<thead>
<tr>
<th>Event</th>
<th>Divisor Adjustment Required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>New addition to the S&amp;P 500(^1)</td>
<td>Yes</td>
</tr>
<tr>
<td>Deletion from the S&amp;P 500</td>
<td>Yes</td>
</tr>
<tr>
<td>New subsidiary inclusion(^2)</td>
<td>Yes</td>
</tr>
<tr>
<td>Subsidiary removal(^2)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

\(^1\) Addition of a new company and its subsidiaries (if applicable).
\(^2\) Addition or removal of a subsidiary and the company remains in the S&P 500.
Index Maintenance

Additions and Deletions

Additions and Deletions to the index universe can occur due to major corporate actions, such as mergers and spin-offs, additions and deletions of companies, or if open jobs posting data is not available for the number of days specified in Eligibility Criteria. Additions to the underlying index are added after a period of 30 days, while deletions become effective at the subsequent weekly calculation period. In the event of a merger, the new jobs opening data will reflect the new total for the combined entities.

Base Dates and History Availability

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

<table>
<thead>
<tr>
<th>Index</th>
<th>Launch Date</th>
<th>First Value Date</th>
<th>Base Date</th>
<th>Base Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500 LinkUp Jobs Index</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Energy Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Materials Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Industrials Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Consumer Discretionary Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Consumer Staples Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Health Care Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Financials Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Information Technology Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Communication Services Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Utilities Index (Sector)</td>
<td>03/27/2019</td>
<td>01/23/2012</td>
<td>01/23/2012</td>
<td>100</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Real Estate Index (Sector)</td>
<td>03/27/2019</td>
<td>09/26/2016</td>
<td>09/26/2016</td>
<td>100</td>
</tr>
</tbody>
</table>
Index Governance

Index Committee

The Index Committee maintains the indices. At each meeting, the Index Committee may review 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

Data Limitations

S&P Dow Jones Indices does not intend to claim the S&P 500 LinkUp Indices are a complete and comprehensive representation of the total open jobs listings from the S&P 500 constituents and their subsidiaries. The index is an indicator, and is calculated on a best-efforts basis using the available data as delivered by LinkUp. Due to potential data issues, there can be times in which the reported value of the indices does not fully capture the total open jobs on a given particular day.

Announcements

Index level (.SDL) and constituent (.SDC) files will be published weekly, on Wednesday morning.

All methodology changes are posted to 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, please refer to the Announcements section of S&P Dow Jones Indices’ Equity Indices Policies & Practices Methodology.

Holiday Schedule

The indices are published every week on Wednesday morning. In the event this falls on a holiday, the data will be published at the same time on the following business day.


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

Recalculation Policy

S&P Dow Jones Indices reserves the right to recalculate an index at its discretion in the event that S&P Dow Jones Indices becomes aware of an error in the data. Any such error will be brought to the Index Committee for their review and a potential restatement of the index values.

Contact Information

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

<table>
<thead>
<tr>
<th>Index</th>
<th>Index Code</th>
<th>Index Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500 LinkUp Jobs Index</td>
<td>SP5LJI</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Energy Index (Sector)</td>
<td>SP5LJIE</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Materials Index (Sector)</td>
<td>SP5LJIMA</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Industrials Index (Sector)</td>
<td>SP5LJIIN</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Consumer Discretionary Index (Sector)</td>
<td>SP5LJICD</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Consumer Staples Index (Sector)</td>
<td>SP5LJICS</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Health Care Index (Sector)</td>
<td>SP5LJIHC</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Financials Index (Sector)</td>
<td>SP5LJIIF</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Information Technology Index (Sector)</td>
<td>SP5LJIIT</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Communication Services Index (Sector)</td>
<td>SP5LJICM</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Utilities Index (Sector)</td>
<td>SP5LJIUT</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
<tr>
<td>S&amp;P 500 LinkUp Jobs Real Estate Index (Sector)</td>
<td>SP5LJIRE</td>
<td>SPUSA-JOBS--JW--US----</td>
</tr>
</tbody>
</table>

Index Data

Daily index level data is available via subscription.

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

Web site

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