



CRSP U.S. EQUITY INDEXES METHODOLOGY GUIDE

December 2016

See [Appendix H](#) regarding the effective dates of upcoming methodology refinements.

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Chapter 1: Introduction

About CRSP

Since its launch over 50 years ago by the University of Chicago Professors James Lorie and Lawrence Fisher, The Center for Research in Security Prices (CRSP) has continued to fill an important niche within the financial industry by providing research-quality data. From the introduction of its initial indexes in 1966 to present day, CRSP's dedicated team has continued to develop innovative products that provide a strong foundation for economic forecasting, stock market research, and financial analysis. CRSP's data is used by a variety of institutions including, but not limited to, academic organizations, investment banks, brokerage firms, corporations, and government agencies.

CRSP's experience with historical indexes and its commitment to excellence in the development and maintenance of the most complete, accurate and easily usable securities data inspired an extension of its core products at CRSP's 50th anniversary mark. In 2010, CRSP introduced the first product in its series of transparent and investable indexes which provide the necessary foundation for the development of the related research products that are central to CRSP's scholarly heritage. The CRSP Indexes are relevant to practitioners, academics and commercial entities alike for the purposes of managing funds, benchmarking, and conducting research. They blend advancements in academic research with current commercial practice in a fundamentally sound manner under the premise that an index must reflect the way that money managers actually invest.

Situated within the Booth School of Business, CRSP is one of 12 research centers that play an integral role in maintaining the reputation the University of Chicago has for being one of the leading academic research institutions in the nation. Chicago Booth, in particular, is renowned for conducting impactful financial and economic research, and for producing ideas and leaders that have shaped the world of business. Founded in 1898, Chicago Booth is the second-oldest business school in the world and is proud to be the first to:

- Have seven Nobel Prize winners on its faculty
- Initiate a PhD program in business (1920)
- Offer an executive MBA degree program (1943)
- Establish permanent campuses on three continents: Asia, Europe, and North America

CRSP's Mission

CRSP is dedicated to excellence in providing enriched and accessible data products and solutions which lay the foundation for scholarly achievement, original innovative research, and sound investment decisions.

Consistent with the research reputation of Chicago Booth, CRSP seeks to encourage the dissemination of knowledge and expansion of the frontier of financial research in a professional environment committed to mutual respect and teamwork.

Chapter 2: Index Construction

Objectives for the CRSP Series of U.S. Equity Indexes

CRSP's investable, real-time indexes strive to blend advancements in academic research with current commercial practice in a fundamentally sound manner and under the premise that an index must reflect the way that money managers actually invest. In order to achieve that goal, CRSP offers capitalization-based, industry sector, and style (value and growth) indexes that utilize leading-edge methodology in order to truly capture the stock market's depth and evolution.

CRSP U.S. Equity Indexes feature the following characteristics, which place emphasis on minimizing unnecessary turnover while maintaining "style purity":

- Packeting approach to migration
- Emphasis on cost efficiency
- Quarterly reconstitution
- Objective and transparent rule-based methodology
- Breakpoints based on cumulative market capitalization
- Investability screens
- Float-adjusted market capitalization

CRSP's methodology was back-tested for a 10-year period between January 2, 2001 and March 30, 2011. A subsequent back-test was run using June 29, 2001 as the start date in order to better align the beginning of the value and growth indexes with the availability of estimates data. Additionally, CRSP's industry sector index methodology was back-tested for a six-year period from January 3, 2005 to March 31, 2011.

Index Construction Process

All CRSP U.S. Equity Indexes begin with the determination of the eligible universe. The index eligibility screening process includes the application of restrictions in listing exchange, incorporation and headquarter location, organization and share types, and the application of investability screens – after which CRSP's broadest index, the CRSP U.S. Total Market Index, is formed. Total shares outstanding and float shares outstanding are determined, total company market capitalizations are calculated, and capitalization-based breakpoints are determined to create the Mega, Mid, Large, Small/Mid, Small, and Micro Cap indexes. Each of these cap-based indexes is then further broken down into value and growth classifications to produce the set of CRSP U.S. Style Indexes. Additionally, the constituents of the CRSP U.S. Total Market Index are subdivided by the industry classification of each member's core business to produce the CRSP U.S. Industry Sector Indexes.

Creating the Index-Eligible U.S. Equity Market Universe

General Universe

The CRSP U.S. Equity Indexes are designed to represent the market of investable U.S. equity securities. They encompass equity securities including common stocks and REITs of U.S. companies that are listed on a CRSP exchange of interest (NYSE, NYSE MKT LLC, ARCA or NASDAQ). The same eligibility rules are applied across all indexes.

The following table specifies which exchanges, and organization and share types are eligible/ineligible for inclusion in the CRSP security universe.

Universe Category	CRSP Index Eligible	Eligible for Market Cap Assignment
Primary Exchange Listing		
NYSE	Y	Y
NYSE MKT LLC	Y	Y
ARCA	Y	Y
NASDAQ	Y	Y
OTCBB	N	Y*
Pink Sheets	N	Y*
Other Consolidated U.S.	N	Y*
International	N	Y*
Organization Types		
Corporation	Y	Y
Real Estate Investment Trust (REIT)	Y	Y
Berkshire Hathaway A & B	Y	Y
Business Development Company (BDC)	N	N
Closed-End Investment Company	N	N
Exchange Traded Fund (ETF) / Exchange Traded Note (ETN)	N	N
Limited Liability Company (LLC)	N	N
Limited Partnership (LP)	N	N
Royalty Trust	N	N
Special Purpose Acquisition Company (SPAC or Blank Check Company)	N	N
Special Purpose Vehicle (SPV)	N	N
Share Types		
Common Shares	Y	Y
American Depository Receipt (ADR)	N	N
Preferred and Convertible Preferred Stock	N	N
Convertible Class B Common Stock	N	Y*
Shares of Beneficial Interest (SBI)	Y unless a fund	Y unless a fund
Rights	N	N
Warrants	N	N
Participating Preferred Stock	N	N
Redeemable Shares	N	N
Trust Receipts	N	N
Units	N, even if the only trading form of an otherwise eligible share type	N, even if the only trading form of an otherwise eligible share type

* Only if representing additional common equity of a company already represented as an index eligible security.

Location description

Securities are further screened for inclusion in the CRSP eligible universe based upon the following location criteria:

1. **The company's headquarters and incorporation are in the U.S.:** Companies both incorporated in and with headquarters in the U.S. are eligible. Others move to Criteria 2.
2. **The company is headquartered in the U.S., a U.S. Territory (UST), Domicile of Convenience (DOC), or Tax Haven (TH):** Companies headquartered in the U.S., a U.S. Territory, Domicile of Convenience or Tax Haven move on to Criteria 3. See Appendix F for list of UST, DOC and TH locations. Others are considered foreign and are not eligible.
3. **The company has an Employer Identification Number (EIN):** Companies that have an EIN move on to Criteria 4. Companies that do not have an EIN and thus do not withhold taxes on U.S. wages or file U.S. tax returns are foreign and are not eligible.
4. **Securities are owned by more than 5% of U.S. domestic equity funds:** If more than 5% of domestic equity funds own a security, as determined by holdings data, U.S. manager sentiment indicates that the security is viewed as U.S. eligible (giving an inclusion bias in Criteria 4). Irrespective of manager sentiment, CRSP will collect any information deemed necessary, but may include additional information on U.S. fund sentiment, asset/operation location, tax/regulatory jurisdiction, history, revenue origin, corporate structure/ownership, primary exchange, etc. All securities from Criteria 4 are appraised by CRSP's Index Eligibility Committee in Criteria 5.
5. **Committee:** The above rules were developed to capture the characteristics of the vast majority of securities, however, when exceptions occur, the Committee will make the final determination of whether or not a security is domestic and included in the CRSP Indexes. For these exceptions, which will include new securities or those that experienced a fundamental change in their characteristics, the Committee will verify by other sources whether a firm actually has notable U.S. assets, revenue, employment and relevant operations, or has obtained an EIN only for nominal visibility purposes. In practice, the Committee may also approve some additional jurisdictions deemed valid for business purposes for a particular company.

The steps above will be re-applied prior to each ranking. Any security that has been included in or removed from the CRSP Indexes based on the Committee's decision will retain that status for one year, unless there is a fundamental change in the security's characteristics. After one year, the security's eligibility status will be reevaluated by the Committee. It is also possible for subscribers to nominate companies for Committee review of eligibility status.

Investability Screens

At quarterly ranking, once the index eligible universe is defined and cap-based breakpoints are determined, investability screens are applied to create pro forma indexes which reflect the anticipated post-reconstitution index constituents.

The investability screens are:

- **Minimum Total Market Capitalization:** The total company market capitalization must be greater than \$15 million to be added to an index at ranking. If, at ranking, the total company market capitalization for a security in the index has fallen below \$10 million, the security will be removed from the index.
- **Float Shares Requirement:** A security's float shares outstanding (FSO), or those shares readily available for trading, must be at least 12.5 percent of the total shares outstanding (TSO) in order for it to be added to an index at ranking. If the actual FSO of a security in the index falls below 10 percent of TSO at ranking, the security will be removed from the index. For securities qualifying as Fast Track IPOs (defined on [page 5](#)) the minimum float requirement is 10 percent.
- **Minimum Trading Volume:** CRSP determines a sparse trading score for each security by calculating the average of the daily split-adjusted consolidated trading volume over the last 125 trading days divided by float shares known as of the end-of-day five trading days before the ranking day. Trading data used for calculating the average for each security is collected no earlier than its first day of regular way trading on a CRSP exchange of interest. In order for a security to be considered for index inclusion at ranking, this ratio must be at least 0.001. If the ratio of a security that is

currently a member of the CRSP Indexes falls below 0.0008 for two consecutive quarters, it is removed from the index. For the small number of organizations with multiple share classes, CRSP may consider the trading volume for all the securities that are represented in the company's total market capitalization.

- **Consecutive Trading Days Requirement:** To be considered for index inclusion at ranking, a security must not have a sequence of 10 or more consecutive non-trading (zero volume) days during the previous quarter. If it does, the security will be removed from the index at ranking. Days that a security is suspended by the exchange do not count toward this requirement.
- **Suspended Securities - effective after the close of March 17, 2017:**
 - If a security has been suspended by its listing exchange for at least 40 days on the ranking day, it will be removed.
 - If the security remains suspended for the entire pro forma period, it will be removed at a price of zero.
 - If the security starts trading during the pro forma period, the security will be removed at its last known closing price.
 - If a security is suspended from trading on the ranking day, it will not be added to the CRSP U.S. Indexes.
- **Seasoning of New Securities:** New securities are eligible for index inclusion if they fulfill at least one of the two following conditions:
 - First day of regular way trading on a CRSP exchange of interest was at least 20 trading days before ranking day.
 - First day of regular way trading on a CRSP exchange of interest was at least 5 trading days before ranking day and the company's capitalization is greater than or equal to the lower breakpoint of the Small Cap index determined at the last ranking. These companies are considered to be Fast Track IPOs.

If a security is removed from the CRSP U.S. Indexes for failing one of the investability screens (deemed uninvestable) it must pass all "drop" thresholds (market capitalization > \$10M, float > 10%, sparse trading score > .0008, consecutive days of zero volume < 10, suspended for < 40 trading days) for four consecutive quarters before it is considered for re-inclusion. Once a security has met the four consecutive quarters requirement for a "drop" threshold, that requirement is considered met.

An uninvestable security that has subsequently passed all of the investability drop screens for four consecutive quarters (now considered for re-inclusion) must also pass the more restrictive "add" thresholds (market capitalization > \$15M, float > 12.5%, sparse trading score > .001, consecutive days of zero volume > 10, not currently suspended) before it can be readmitted (added back) to the CRSP U.S. Equity Indexes.

For example:

1. Security A is removed at the December 2020 rebalance for having a float percentage of less than 10 percent (Float Shares Outstanding/Total Shares Outstanding < 10 percent)
2. Security A passes all drop thresholds for four consecutive quarters (March, June, September, and December of 2021)
3. At the December 2021 rebalance the security may be readmitted to the CRSP U.S. indexes if in addition to passing the drop thresholds for four consecutive quarters, it passes all of the more restrictive add thresholds.

If a security is removed from an index due to delisting from a CRSP exchange of interest and it is later readmitted to that or another CRSP exchange of interest, the security cannot be added back to an index earlier than the fourth ranking after it was removed, unless the entity is reconstituted or restructured and treated as an IPO or some form of merger before reentry.

The Minimum Total Market Capitalization and Float Shares Requirement investability screens are also applied mid-quarter when adding or reevaluating securities after certain corporate actions such as spin-offs or large capitalization mergers.

Universe Shares and Index Holdings

Total and Float Shares Outstanding

The CRSP U.S. Equity Indexes are free float adjusted capitalization-based indexes. Float shares outstanding represent the total shares outstanding less any restricted shares, which are defined as those held by insiders or stagnant shareholders – including, but not limited to: board members, directors and executives; government holdings, employee share plans, and corporations not actively managing money. CRSP defines a security’s float factor to be the ratio of float shares outstanding to total shares outstanding, expressed as a percentage. While float adjusted market capitalization is used to determine a security’s weight within an index, total shares outstanding are used to rank companies by size at ranking. The shares figures used are the last known values as of the close five trading days prior to ranking, unless shares are impacted by a corporate action during this five day period. Holdings are not updated intra-quarter unless a security undergoes a corporate action. If a non-neutral corporate action occurs, the holdings are calculated using the post-corporate action total shares outstanding and float factor. If a neutral corporate action that affects shares occurs, then holdings are adjusted by applying the rate indicated in the corporate action.

Effective Float Factor

At ranking, CRSP generates an effective float factor (EFF) for all index constituents, defined as the float factor (percentage) rounded to the nearest five percent. An effective float factor will remain in place from reconstitution day until the following quarter unless the security is affected by an intra-quarter non-neutral corporate action, such as a merger, spin-off, or secondary offering. CRSP calculates an effective float factor when applying intra-quarter non-neutral corporate events and when adding new securities to indexes as a result of the Fast Track IPO process.

Index Holdings

Once effective float factors are calculated for all securities, index holdings are calculated for each by multiplying the security’s total shares outstanding by its effective float factor as well as index-specific multipliers. These multipliers exist for size, style, and sector indexes to enforce shared holdings due to migration or to change holdings in order to satisfy legally-mandated IRS concentration constraints. Like the effective float factor, index holdings are calculated on ranking day and remain in place until the following ranking, unless affected by an intra-quarter corporate action. From index holdings, a security’s weight in an index is calculated as (security’s index holdings * security’s price)/total index market cap. While a security’s effective float factor and index holdings will not change on a daily basis, its weight within an index will be affected by fluctuations in its price or fluctuations in index capitalization of other securities in the index.

See chapters [4](#) and [5](#) for information on sector and value and growth style index construction.

CRSP U.S. Capitalization-based Indexes

The following CRSP U.S. Capitalization-based Indexes are currently offered:

Index Name	NASDAQ Symbol	
	Total Return	Price Return
CRSP U.S. Total Market Index	CRSPTMT	CRSPTM1
CRSP U.S. Mega Cap Index	CRSPMET	CRSPME1
CRSP U.S. Mid Cap Index	CRSPMIT	CRSPMI1
CRSP U.S. Large Cap Index	CRSPLCT	CRSPLC1
CRSP U.S. Small / Mid Cap Index	CRSPSMT	CRSPSM1
CRSP U.S. Small Cap Index	CRSPSCT	CRSPSC1
CRSP U.S. Micro Cap Index	CRSPMCT	CRSPMC1

Assigning Companies to Indexes: Capitalization-based Breakpoints and Bands

CRSP assigns companies eligible for the U.S. Total Market Index to more size-specific cap-based portfolios according to total company market capitalization calculated using total shares outstanding. Unlike count-based indexes, the CRSP Indexes do not have a limit on the number of companies that may comprise an index. This feature allows for the CRSP Indexes to better reflect the market's evolution, as the number of listed securities can change substantially over time.

At ranking, companies are sorted from largest to smallest based on each company's total market capitalization. Market capitalization is determined using a security's total shares outstanding multiplied by the security's price on a "random price day" (see [Chapter 3 – Index Maintenance - Quarterly Maintenance](#) section for more details on the Ranking and Reconstitution process). The market capitalizations of all index eligible securities of a given company are then summed together to determine the company's total market capitalization used for ranking. Once all index eligible companies are sorted, each company is then assigned a cumulative market capitalization score, which is equal to the cumulative capitalization of all higher capitalization companies plus half of capitalization of the company that is being ranked, expressed as a percentage of the market capitalization of all eligible companies. In other words, the score is based on the midpoint of a company's market cap in order to ensure it is assigned to the index in which the majority of its market capitalization lies.

Breakpoint targets are then set at 70 percent, 85 percent and 98 percent of the cumulative market cap of the index eligible universe.

At each ranking, the actual market capitalization of the largest company and the smallest company in each index is noted. These sizes determine the ranges for assignment of new additions or of securities impacted by corporate actions. A company is considered valid for an index if its capitalization is less than or equal to that of the largest company in the index and greater than that of the largest company in the adjacent lower capitalization index.

Companies lying at or near the boundary of market capitalization breakpoints are viewed as being in a transitional area between adjacent capitalization indexes. In order to prevent the premature movement of these "borderline" companies to a new index, CRSP establishes different percentage "bands" around each breakpoint. Movement of companies in or near these bands is restricted and can result in securities being partially held in adjacent indexes. This approach balances the desire to maximize style purity while minimizing index turnover.

Banding and Migration with Packeting

In order to prevent the premature movement of companies located near the established breakpoints, CRSP considers different percentage "bands" around each breakpoint. Band percentages can be seen in the diagram that follows this section. Movement between indexes is cushioned by introducing the concept of "packeting". CRSP defines a packet as 50 percent of the index's total holdings of a company. Movement occurs when a company passes completely through to the other side of a shared band between indexes into the core of the adjacent index.

Once a company crosses the threshold into the adjacent core, one packet (50%) is moved. If a company remains in the adjacent core at the next ranking, then the second packet (remaining 50%) is moved into the adjacent index.

At ranking, if a company with a 100 percent allocation in an index moves beyond the core of the adjacent index, then the company is moved entirely (100%) to the new capitalization-based index. Similarly, if a company with 50 percent allocation in an index moves beyond the core of the adjacent index, then that allocation is moved entirely (100%) to the new capitalization-based index.

If the company moves back into the shared band then no further packets are moved (the holdings are kept in the same proportion). No movement is exercised if the company ranks within the band. In other words, a security may remain in a transitional band area indefinitely.

When a company is new to an index family (such as an IPO), it is added fully to the appropriate cap-based index strictly on breakpoints (bands are ignored).

See [Appendix A](#) for banding and migration examples.

Capitalization-based Indexes, Breakpoints and Bands

CRSP defines the following U.S. capitalization-based indexes and their associated bands:

CRSP U.S. Mega Cap Index:

- Index range: $0 < X_{i,t} \leq 70\%$
- Band range: $64\% < X_{i,t} \leq 76\%$; breakpoint : $X_{i,t} = 70\%$
- Mega Only: $0\% < X_{i,t} \leq 50\%$;
- Adjacent core: $76\% < X_{i,t} \leq 81\%$ (mid core)

CRSP U.S. Mid Cap Index:

- Index range: $70\% < X_{i,t} \leq 85\%$
- Band ranges:
 - $64\% < X_{i,t} \leq 76\%$; breakpoint: $X_{i,t} = 70\%$ and
 - $81\% < X_{i,t} \leq 89\%$; breakpoint: $X_{i,t} = 85\%$
- Adjacent cores:
 - $50 < X_{i,t} \leq 64\%$ and (mega core)
 - $89\% < X_{i,t} \leq 96\%$ (small core)

CRSP U.S. Large Cap Index:

- Index range: $0 < X_{i,t} \leq 85\%$
- Band range: $81\% < X_{i,t} \leq 89\%$; breakpoint: $X_{i,t} = 85\%$
- Adjacent core $89\% < X_{i,t} \leq 96\%$ (small core)

CRSP U.S. Small / Mid Cap Index:

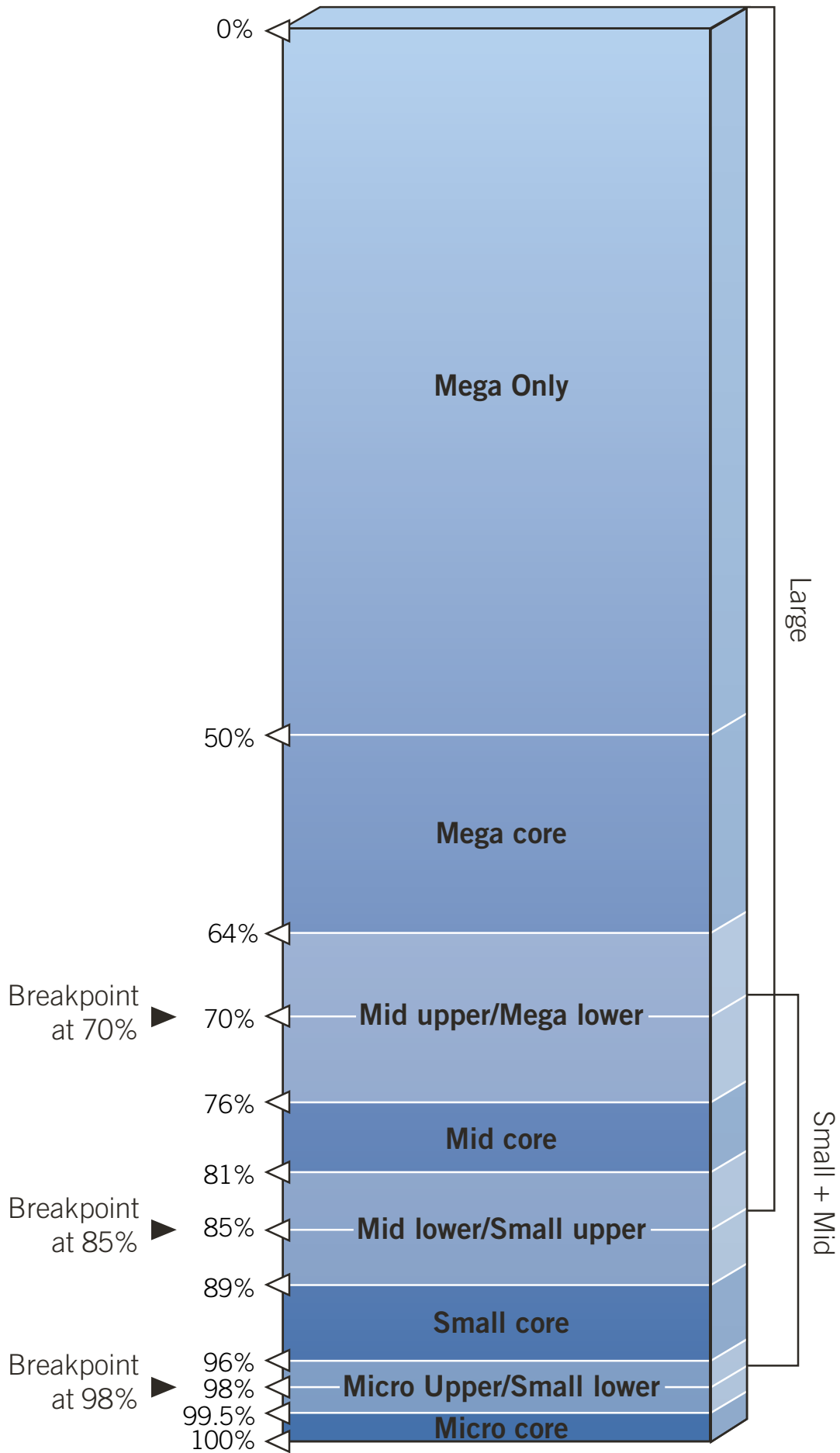
- Index range: $70\% < X_{i,t} \leq 98\%$
- Band ranges:
 - $64\% < X_{i,t} \leq 76\%$; breakpoint: $X_{i,t} = 70\%$ and
 - $96\% < X_{i,t} \leq 99.5$; breakpoint: $X_{i,t} = 98\%$
- Adjacent cores:
 - $50 < X_{i,t} \leq 64\%$ and (mega core)
 - $99.5\% < X_{i,t} \leq 100.0\%$ (micro core)

CRSP U.S. Small Cap Index:

- Index range: $85\% < X_{i,t} \leq 98\%$
- Band ranges:
 - $81\% < X_{i,t} \leq 89\%$; breakpoint: $X_{i,t} = 85\%$ and
 - $96\% < X_{i,t} \leq 99.5$; breakpoint: $X_{i,t} = 98\%$
- Adjacent cores:
 - $76\% < X_{i,t} \leq 81\%$ and (mid core)
 - $99.5\% < X_{i,t} \leq 100.0\%$ (micro core)

CRSP U.S. Micro Cap Index:

- Index range: $98\% < X_{i,t} \leq 100\%$
- Band range: $96\% < X_{i,t} \leq 99.5\%$; breakpoint: $X = 98\%$
- Adjacent core $89\% < X_{i,t} \leq 96\%$ (small core)



Chapter 3: Index Maintenance

Quarterly Maintenance

Ranking and Reconstitution

CRSP U.S. Equity Indexes are reviewed on a quarterly basis. The review process consists of reevaluating each security's eligibility, investability, and capitalization. In addition, index construction rules for each index family are applied. See Chapter 2: Index Construction for more information on the review and the process undertaken for the Total Market and Capitalization indexes. Chapters 4 and 5 include information regarding Sector and Style index construction rules.

The review process is completed on a ranking day, after the close of the first Friday of March, June, September, and December. The ranking day initiates a ranking period, or pro forma period, where the new constituents and holdings for each index are reported in a separate associated pro forma index while the current index continues.

By the end of the ranking period, on reconstitution day, after the close of the third Friday of the month of ranking, the indexes are fully reconstituted (converted to the targets maintained in their pro forma indexes) and the pro forma indexes cease to exist.

Transitional Reconstitution – effective with the September 2017 ranking

The conversion from current index membership and holdings into their updated pro forma targets is done over a five-day transition period. The transition period begins after the close of the Wednesday (First Transition Day) after the second Friday of March, June, September, and December, and ends (Final Transition Day) after the close of the Tuesday after the third Friday of March, June, September, and December. During the five-day transition period, CRSP will move 20% of the change in holdings from the current index to the target pro forma index each day. More precisely, the goal of each transition day is to move the difference in holdings between the current index and the target pro forma index, divided by the number of remaining days in the transition period, including the final day of the five-day transition period. On the final transition day the remaining holdings are moved regardless of the past rates during the transition.

By the end of the ranking period, on the final transition day, after close of the first Tuesday after the third Friday of the month of ranking, the indexes are fully reconstituted (converted to the targets maintained in their pro forma indexes) and the pro forma indexes cease to exist.

Pro forma indexes are subject to daily maintenance for corporate actions like other indexes. In some cases there are adjustments in the rules for handling corporate actions during the ranking period. These are noted below and in the appropriate daily maintenance chapters. CRSP may make adjustments to the holdings of individual pro forma constituents. Pro forma holdings adjustments are generally applied during the first week following the ranking day. The pro forma is considered final after the close on the last trading day of the week after the ranking day, although still subject to daily maintenance while it is active.

[Appendix H: Transitional Reconstitution Calendar](#) defines the various segments of the pro forma period. Generally, in cases of holidays or unscheduled market closures during the ranking period, the pro forma adjustment period may be shortened, but the transition period will remain five days and be adjusted if necessary.

Determining Price on Random Price Day

CRSP uses the closing price for all eligible securities on a “random price day” to determine the company's total market capitalization used at ranking. The random price day is selected algorithmically from the seven trading days immediately prior to the ranking day according to the following convention:

- The two days with the highest aggregate absolute price moves (using the CRSP U.S. Total Market Index as the point of reference) are excluded.

- The two days with the lowest aggregate trading volume (using the CRSP U.S. Total Market Index as the point of reference) are excluded.
- The excluded days above may overlap.
- The remaining days will be used to randomly select the random price day.

Prices are adjusted for all corporate actions to place companies on the same basis on the ranking day. A security not yet trading (pending listing) on the random price day is valued using its closing price on its first day of trading.

Banding and Migration with Packeting

In order to prevent premature movement of companies near established breakpoints, CRSP considers bands around each breakpoint, which cushions the security's movement between indexes through the idea of packeting. A packet is defined as 50 percent of the index's total holdings. Due to migration rules, securities may be held simultaneously in multiple indexes. CRSP's banding and migration rules are applied to both capitalization and style-based indexes. Industry sector constituents will not packet from one sector to another. See chapters on CRSP U.S. Capitalization and CRSP U.S. Style-based indexes for family-specific banding and migration information. See also [Appendix A](#) for banding and migration examples.

Corporate Actions during Pro Forma Period

If a non-cap neutral corporate action that impacts holdings occurs during the pro forma period, CRSP seeks to evaluate and move the resultant entity only once. If the corporate action causes a reevaluation during this time, the affected company will be migrated from its location in the primary indexes, not the pro forma index.

Effective with the September 2017 Ranking and Transitional Reconstitution

Secondary Offerings during the Pro Forma Period

Before the Transition Period

1. If offering number of shares is greater than or equal to 5% of the CRSP U.S. Total Market Index pro forma and primary holdings, CRSP will apply the secondary offering to both pro forma and primary indexes
2. If offering number of shares is greater than or equal to 5% of the CRSP U.S. Total Market Index pro forma index holdings and less than 5% of primary holdings, CRSP will apply the secondary offering to the pro forma index only
3. If offering number of shares is greater than or equal to 5% of the CRSP U.S. Total Market Index primary index holdings and less than 5% of pro forma holdings, CRSP will apply the secondary offering to both pro forma and primary indexes
4. If offering number of shares is less than 5% of the CRSP U.S. Total Market Index pro forma and primary holdings, CRSP will not apply the secondary offering.

During the Transition Period

If offering number of shares is greater than or equal to 5% of the CRSP U.S. Total Market Index pro forma index holdings and less than 5% of primary holdings, CRSP will apply the secondary offering to both pro forma and primary indexes (cases 1, 3, and 4 remain the same as above).

Reverse Mergers during the Pro Forma Period

If the new company size is greater than or equal to the Large Cap breakpoint from the last ranking, then no transition or reconstitution is done for the new company until the reevaluation, i.e. the transition is frozen.

Special Cases:

- If the company is reevaluated by the final transition day, then it will migrate from the packeting location in the primary index.
- If the company is reevaluated after the final transition day, then it will migrate from the packeting location that was targeted in the pro forma index. In other words, the reevaluation/rebalance for the new company will be postponed until after the final transition day.

Daily Maintenance

Changes in the CRSP U.S. Equity Indexes occur on a daily basis as a result of numerous factors, including price movements, corporate actions, and security additions and deletions. In order to accurately track and reflect these potentially impactful daily changes, CRSP uses the following price methodology.

Prices

Start-of-day Price

A security's start-of-day price is defined as the previous day end-of-day price adjusted for all splits and non-ordinary distributions, such as special dividends, rights distributions, returns of capital, and spin-offs. See section on Corporate Actions ([Chapter 3: Index Maintenance – Daily Maintenance – Corporate Actions](#)) and the [Price Adjustment Table in Appendix B](#) for further information on the calculation of start-of-day price.

For example, if a detached (dummy) security is created on the ex-date of a non-ordinary distribution (such as a spin-off or mandatory distribution) to represent a stock received but not yet trading regular way, the detached security's start-of-day price on the ex-date is initially set to zero. The zero price of the detached security is then revised to the price difference between the parent security's end-of-day price and start-of-day price at the end of the ex-date. The start-of-day price of a parent security in a corporate action with a detached (dummy) security will be revised to match its end-of-day price at the end of the ex-date.

End-of-day Price

Closing prices are assigned in the following order of precedence to securities traded on NYSE, NYSE MKT LLC, ARCA or NASDAQ:

1. The closing price reported by the primary listing exchange. If no volume on the primary exchange, move to 2.
2. The last trade price from consolidated price feeds. If no volume on the primary or consolidated tape, move to 3.
3. The last traded date end-of-day price carried forward. Bid-ask averages are not used to fill gaps, and no adjustment is made to adjust prices based on the market or market segments.
4. CRSP will calculate an end-of-day price adjustment amount from the terms of the corporate action in cases where a security could not be valued accurately at the start of a day.

Final Closing Value for Delisted Securities

A security that delists from a CRSP exchange of interest but is still held in indexes (e.g. late primary exchange delist notification, trading halted or suspended on the day prior to the effective date of the delist) carries forward its last known primary exchange closing price until it can be valued and removed from the indexes.

If trading volume is first identified on a secondary exchange by 1:30 p.m. CST on one of the first nine trading days after the security has been delisted from its primary exchange delist (day 1 is the effective date of the delisting) it will be removed effective after the close of that trading day. If volume is first identified on a secondary exchange after 1:30 p.m. CST on one of the first eight trading days after the primary exchange delist, the security will be removed effective after the close of the following trading day. If neither of the above cases occurs, the security will be removed effective after the close of the tenth trading day.

In the above cases securities are valued (marked) using the following order of precedence:

1. The latest closing price reported on a secondary exchange. If no volume on the secondary exchange, go to step 2.
2. The closing bid on a secondary exchange on the tenth day after the primary exchange delist. If no closing bid on the tenth day is reported, go to step 3.
3. The security is marked at a price of zero.

Price Adjustments as a result of Corporate Actions

If a security is held in an index but is in the process of exchanging itself for other property (or another security) as part of a merger, acquisition, or liquidation, the security's value is determined using the following order of precedence:

1. The total value of all distributions (cash and/or stock) received in exchange for the security through the current day.
2. The start-of-day price carried forward. A price can be carried forward no more than 10 trading days after its last day listed on a CRSP exchange of interest.
3. Partial liquidation payments after delisting are applied as they are paid, up through the end of the eleventh day after delisting. If no final payment is made by the eleventh day the security is removed with a price of zero.

See [Price Adjustment Table in Appendix B](#).

Corporate Actions

This section describes how CRSP processes corporate actions that impact the CRSP U.S. Equity Indexes. It includes the following types of corporate actions:

- Mergers
- Adds & Delists
- Capital Raising Events
- Capital Distribution Events
- Capitalization Neutral Events

CRSP adheres to the principles of replicability, consistency, maintaining style purity, and minimizing turnover when implementing corporate actions, with the ultimate objective of reflecting changes in the U.S. equity market on a timely basis. When a corporate action occurs such that index eligibility cannot be determined in a timely manner, CRSP will evaluate the security's eligibility at the next ranking.

Share Changes Reported in Corporate Filings

Any changes to total or float shares outstanding that are not directly attributable to a single corporate action on a specific day, but are reported in corporate filings, are applied at the next regularly scheduled quarterly ranking. If a non-neutral corporate action that impacts holdings occurs intra-quarter, the last known total and float shares outstanding (adjusted for the corporate event) are used to calculate index holdings.

Mergers

A merger is a corporate action in which two or more companies are combined into one, creating a new entity. Shares of the non-surviving entity are exchanged for shares of the surviving entity, cash, or both. The surviving entity will be evaluated for index inclusion immediately, and the non-survivor will be removed from the CRSP Indexes and universe.

Implementation of Mergers

Non-surviving participants of a merger are generally removed from the index after the market close on the day before the effective date. However, if necessary, the non-survivor may be kept in an index until the surviving entity can be valued. Assuming both participants are index eligible and investable, a stock merger will result in a change of shares outstanding for the surviving security and, consequently, its index holdings after the close on the trading day before the effective date (i.e. the first day of trading of the combined entity).

CRSP will reevaluate "large" mergers intra-quarter if the resultant (combined) entity's market capitalization is at least as large as the lower breakpoint of the CRSP U.S. Large Cap Index as of the last ranking. If CRSP can confirm the merger

is complete and is able to acquire the information necessary to determine the company's market capitalization, sector, and value/growth placement by 1:30 p.m. CST on the trading day before the merger's effective date, it will reevaluate the surviving entity. Any changes made will be effective after the close on the trading day before the effective date. Banding and migration rules will apply, with migration originating from the index location of the company with the largest pre-merger market capitalization. If the resulting company does not meet the size requirements for immediate reevaluation, it will remain in its current index and will be reviewed at the next ranking. In general, no changes will be made at the time of the corporate action if the acquired entity is not index eligible and investable.

Late Announcement of Completed Mergers

If the completion of a merger is confirmed after 1:30 p.m. CST on the trading day before the effective date, then the non-surviving entity may appear in an index on the effective date. Its end-of-day value will be set to the sum of the value of the shares received plus any cash amounts distributed, and it will be removed on the following trading day (the day after the effective date). Late mergers will be reevaluated if the merger meets the same criteria as an on-time merger.

Merger and Concurrent Spin-Off

If a corporate action involves both merger and spin-off components, the spin-off rules take precedence. All involved companies are reevaluated after the close of the first day that all participant securities are trading regular way. As opposed to the "large" capitalization merger reevaluation methodology there is no minimum size requirement to block companies from packeting between indexes.

In general, the non-surviving merger security will not trade on the effective date of the merger/ spinoff. The company's pre-event index capitalization is held constant for a day. This is done by either continuing its holdings and valuing as described for Late Announcement of Completed Mergers, or if possible converting its holdings to a trading security with a known start-of-day price at the rate denoted in the corporate action.

If a corporate action involves both reverse merger and spin-off components, reevaluation is no earlier than after the close of the fifth trading day after the effective date, but otherwise is processed as above.

Merger with Election

In some mergers, shares of the acquired company will be exchanged for a combination of cash and stock of the surviving company where either the cash amount or the number of shares is limited. Standard merger implementation applies, but a prorated stock and cash payout will be used, taking into account the stated limits. If the final shares payout cannot be determined on the day before the effective date, the merger will be completed when the final payout is known.

Reverse Mergers

Any merger in which the surviving entity originates from outside of CRSP's security universe is treated as a reverse merger. This includes, but is not limited to, cases where the acquiring company is either private, foreign, or does not trade on a CRSP exchange of interest. If the resulting security from the reverse merger is index ineligible, then CRSP will remove it from its indexes after the close of the trading day before the effective date. Otherwise, current index holdings will be replaced by an equivalent amount of the survivor after the merger terms are applied.

CRSP will reevaluate "large" reverse mergers intra-quarter after the close on the fifth day of regular way trading of the new entity if at least one of the resultant companies' market capitalizations, as of the close of the first day of regular way trading, is at least as large as the lower breakpoint of the CRSP U.S. Large Cap Index as of the last ranking. If the resultant entity's change in size, industry or style is significant enough to warrant moving indexes, CRSP will remove the old entity and reassign the new entity to the appropriate market cap, sector and/or style indexes. Banding and migration rules will apply, with migration originating from the index location of the company with the largest market capitalization. A new effective float factor will be calculated and multiplied by total shares outstanding on the first day of regular way trading in order to determine the new index holdings.

A reverse merger that does not qualify for reevaluation will be kept in the current index with holdings reflective of the entitlement received on the effective date.

Exchanges and Conversions

An exchange or conversion is a mandatory swapping of one security for another security of the same company, such as a preferred stock being converted into a common stock or one class of security being exchanged for another class. If the received security will no longer trade on a CRSP exchange of interest, it will be removed from all indexes after the close on the day before the effective date. If the resultant (received) security is a constituent of the CRSP U.S. Total Market Index, the additional shares from the exchange will be added to the last known shares of the existing security on the effective date, according to the following convention:

$$Sp = So + (Sc \times Cr)$$

Sp = new shares of post-conversion security

So = old shares of converted security

Sc = shares of converting security

Cr = conversion rate

The effective float factor is recalculated using the post conversion total and float shares outstanding figures. Index holdings are adjusted accordingly. The security will remain in its current indexes and will not be reevaluated until the next ranking, regardless of any increase in market capitalization.

If the resultant security is new (not already existing in the CRSP security universe), shares of the new security are determined according to the following convention:

$$\text{Shares of New Security} = \text{Shares of Converting Security} \times \text{Conversion Rate}$$

The new security is eligible for index inclusion immediately.

Tender Offers

A tender offer is an external public offer made directly to a company's shareholders to buy their stock at a specified price, usually at a premium over the prevailing market price. Generally, the objective of a tender offer is to take control of the target company.

As a guideline, CRSP will consider the tender offer successful if the security being acquired is trading within 10 basis points of the tender price at the time of tender expiration, and either:

1. 95 percent of the company's shares have been tendered, or
2. The initial tender offer has expired and the acquirer seeks to complete the acquisition via a short-form merger.

If a tender offer is successful, it will affect the indexes in the same way as a merger. No action is taken if the tender offer is unsuccessful.

If a security is removed from an index but the tender offer is subsequently declared unsuccessful, the security will not be reinstated immediately. Instead, it will be reconsidered for index inclusion at the next regularly scheduled quarterly ranking.

Partial Liquidations

In general, a security that is under a plan of liquidation but is still listed on a CRSP exchange of interest will be removed from indexes after the close of the trading day before the ex-date of a partial liquidating payment if either of the following is true:

1. The estimated market capitalization of the remaining security is less than \$10 million, or
2. The partial payment includes non-transferable property estimated to be at least 90 percent of the value of the current pre-event market price of the liquidating security.

If a security is removed from the indexes because either of these criteria is met, it will not be reconsidered for index inclusion until the fourth ranking after its removal.

Adds and Delists

Initial Public Offerings (IPOs) - effective after the close March 17, 2017

A new security resulting from an initial public offering (IPO) is considered for inclusion after trading regular-way for five days on a CRSP exchange of interest. Total company market capitalization is calculated using the closing price and shares known on the first day of trading.

If the offered security's total company market capitalization is at least as large as the breakpoint of the CRSP U.S. Small Cap Index, then it is eligible to be added to the appropriate indexes after the close of the fifth day of trading as a Fast Track IPO. The security must also pass the eligibility and investability screens (however, for Fast Track IPOs, the minimum Float Share Requirement is 10 percent), as stated in the "[Creating the Index-Eligible U.S. Equity Market Universe](#)" section of Chapter 2. Otherwise, the security is not immediately added to indexes but is reviewed for inclusion at the next regularly scheduled quarterly ranking.

Other Adds

In general, if a pre-existing company moves from a non-eligible exchange (e.g. OTCBB) to an exchange eligible for CRSP Indexes, or converts to a new share class independent of any net distributions, then the new security is reevaluated at the next regularly scheduled quarterly ranking.

Delistings

A security that delists from a CRSP exchange of interest is removed from all indexes. Delistings may or may not be related to corporate action events, such as mergers and acquisitions, bankruptcies and liquidations.

Delists Unrelated to Corporate Actions

A security that delists from a CRSP exchange of interest voluntarily or due to a violation of exchange rules or other regulatory requirements will be removed from indexes. If the exchange delist is confirmed by 1:30 p.m. CST on the day before the delist and is actively trading on that day, it will be removed after close of that day. If not, the security will continue in indexes until it can be valued. See [Final Closing Value for Delisted Securities](#).

Delists due to Mergers and Acquisitions

A security that delists from a CRSP exchange of interest due to the exchange of its stock as part of a merger or acquisition is removed from all indexes after the close of the last day of trading, assuming the event is confirmed effective before 1:30 p.m. CST on the trading day before the effective date. If the merger or acquisition event is confirmed to be final after 1:30 p.m. CST on the trading day before the effective date, the security is kept in its indexes and is removed on the following trading day.

Delists due to Bankruptcy

In the event that a company declares bankruptcy, CRSP will continue to hold its securities in their respective indexes as long as each security remains listed on a CRSP exchange of interest. The securities will be reviewed at ranking using the same investability and eligibility screens.

When a company's bankruptcy results in a security's removal from a CRSP exchange of interest, the security will be removed from all indexes after the close of the last day of trading on a CRSP exchange of interest. If the delist due to bankruptcy is confirmed after 1:30 p.m. CST on a day when the affected security is still trading on a CRSP exchange of

interest, or it is suspended from trading on the day before delisting, the security will be kept in all indexes until a final valuation can be assigned.

See [Final Closing Value for Delisted Securities](#) for further details on when it is removed and at what value. These rules are adjusted for bankruptcies if an official final or partial payment is announced and known before the security can be removed. If a final payment is announced, then the security will be taken out as soon as practicable at that value. If partial payments are announced, then the security will be removed at the total of the partial payments instead of zero if it reaches the tenth day.

Delists due to Liquidation

When a company announces its intention to delist from a CRSP exchange of interest due to liquidation, the security will be removed from all indexes after the close of the last day of trading on a CRSP exchange of interest. If the delisting is confirmed after 1:30 p.m. CST on the last day of trading, the security will be kept in all indexes until a final valuation can be assigned.

See [Final Closing Value for Delisted Securities](#) for further details on when it is removed and at what value. These rules are adjusted for liquidations if an official final or partial payment is announced and known before the security can be removed. If a final payment is announced, then the security will be taken out as soon as practicable at that value. If partial payments are announced, then the security will be removed at the total of the partial payments instead of zero if it reaches the tenth day.

Capital Raising Events

Rights Distributions

A rights distribution is an event in which current shareholders are given the option to buy, within a certain period of time, a specified number of additional shares from the company at a specific price, usually below the current market price.

In-the-Money and Out-of-the-Money Rights - effective after the close March 17, 2017

If the subscription price of the right is less than the end-of-day price of the underlying security on the trading day before the ex-date of the rights distribution, the rights are considered to be “in-the-money” and are generally assumed to be fully subscribed and exercised. Accordingly, the issuing security’s index holdings are increased after market close on the ex-date. A right or warrant is bundled with the distributing security on the ex-date. While only the distributing security is reported as a constituent, the combined start-of-day capitalization of the security and its distributed right or warrant is reported for this security.

At the end of the ex-date, the right or warrant is valued separately and is added as a payment value (end-of-day price adjustment) to the original security. The payment amount used is the higher of either the in-the-money amount or the trading value of the right or warrant at the end of the ex-date.

If the right is in-the-money, based on the closing price before the ex-date, then the shares of the distributing/offering company are increased after the close of the ex-date as if all exercisable rights are exercised. If the distributing/offering company is in the index (index constituent), its index holdings are trued-up based on its new total shares outstanding and float.

In general the imputed right or warrant is no longer considered part of any CRSP index after the close of the ex-date.

If the subscription price of the right is greater than or equal to the end-of-day price of the underlying security on the trading day before the ex-date, the rights are considered to be “out-of-the-money”, and index holdings are not adjusted.

Price Adjustment for Rights Distributions

The price of a company’s securities distributing rights is adjusted on the ex-date based on the trading value of the right

distributed or the derived fair market value of the right when the right is not trading prior to the ex-date. The following cases are recognized:

- If a transferable right is trading by the end of the ex-date, the start-of-day price of the distributing security remains unchanged. However, the effective end-of-day price will be increased by the value of the right.

End of Day Payment Value Adjustment = Rights Ratio × Right Closing Price on the ex-date

- If a transferable right does not trade by the end of the ex-date, then the start-of-day price of the distributing security will remain unchanged. However, the end-of-day price on the ex-date will be increased by the derived fair market value of the right using the formula indicated below.

FMV = Start of Day Distribution Value = $R_r \times S_r \times \text{Max}(0, U_p - S_p)$

S_r = Subscription Ratio

S_p = Subscription Price

R_r = Rights Ratio

U_p = Underlying Price

- If a right is non-transferable, the end-of-day price of the distributing security will be adjusted by the derived fair market value (FMV) of the right.
- Rights received in an offering that entitle the holder the option to buy securities that are not members of the CRSP U.S. Total Market Index (not index eligible or investable, e.g. bonds, preferred shares, foreign equities, unlisted securities) are implemented in the following manner:
 - The end-of-day (ex-date) price of the distributing security is adjusted only if the value of the right can be determined on the ex-date.
 - The holdings of distributing company generally remain unchanged.

The underlying assumption is that the rights are sold rather than exercised.

Warrant Distributions - effective after the close March 17, 2017

Warrant distributions are treated in the same manner as rights distributions. Refer to the previous Rights Distribution section. However, received warrants are generally assumed to be sold rather than exercised. In other words, as opposed to in-the-money rights distributions, index holdings are not increased effective after the close of the ex-date.

Secondary Offerings

A secondary offering involves selling shares to the public after the company's initial public offering. CRSP makes the following distinction between two types of secondary share offerings:

Primary equity offerings (primary shares) involve the issuance of additional ("new") shares of a security. CRSP increases both the total shares outstanding (TSO) and the float shares outstanding (FSO) by the number of additional shares issued, using the most recently available TSO and FSO figures. The effective float factor and index holdings are then recalculated using these new figures.

Secondary equity offerings (secondary shares) involve the distribution of already issued ("old") shares. The FSO will be increased by the number of shares distributed, using the most recently available share figures, however, since the company did not issue additional shares, the TSO remains unchanged. The effective float factor and index holdings are then

recalculated using these new figures.

Implementation:

5% Threshold and Timing

Changes in index holdings resulting from primary or secondary equity offerings that represent 5% or more of a security's holdings in the U.S. Total Market Index are implemented as of the close on the day after the issue prices or the following trading day, if all necessary information is known before 1:30 p.m. CST on the trading day after the pricing of the offering. Otherwise, the event is implemented at the next regularly scheduled ranking or upon the application of an intra-quarter non-cap neutral corporate action.

Primary or secondary equity offerings that represent less than 5% of a security's holdings in the U.S. Total Market Index are implemented at the next quarterly ranking or upon the application of an intra-quarter non-cap neutral corporate action.

Exclusions

Index holdings are not immediately impacted upon the pricing of a Forward Sales Agreement or at the time of a Private Placement. However, the increased number of shares will be considered at the next ranking or upon the application of an intra-quarter non-cap neutral corporate action.

Block Trades or Spot Secondaries (Strategic Shareholder Sales)

CRSP considers a Spot Secondary or Block Trade to be a privately-negotiated transaction involving a change in strategic ownership that does not require SEC registration. Unlike a standard secondary offering, a block trade is generally only made available to institutional investors and is implemented without an underwriter or prospectus. CRSP requires an official press release or news story confirming the block trade in order to make the associated holdings change.

Implementation:

5% Threshold and Timing

Changes in index holdings resulting from strategic block trades that represent 5% or more of a security's holdings in the U.S. Total Market Index will be implemented on a best-efforts basis. CRSP will increase holdings no later than effective after the close two trading days after the sale is consummated. Otherwise, the event will be implemented at the next regularly scheduled ranking or upon the application of an intra-quarter non-cap neutral corporate action.

Capital Distribution Events

Spin-offs

A spin-off (divestiture) is the creation of an independent company through the distribution of new shares of an existing business or division/subsidiary. Shares of the new organization are allocated to equity holders of the parent organization at a ratio established by the parent.

Implementation of Spin-offs

Capitalization, Style and Sector index placement for the participants in a spin-off are determined based on the latest of:

- The close of the first day of when-issued trading, or
- The ranking day before the ex-date and after the first day of when-issued trading, or
- The effective date of any non-neutral corporate action for the parent (e.g. secondary offering), other than the spin off, which occurs after the first day of when-issued trading but before the ex-date of the spin off.

Prices and total shares outstanding known at one of the above times will be used to determine the market capitalization used in reevaluation. The post spin-off industry classification codes for both the parent company and spun-off company will be used to determine industry sector placement. If no industry classification code is available for the spun-off company, the spun-off company will inherit the parent company's sector placement. Both the parent and spun-off companies are reevaluated for style index placement at this time as well. If no style determination is able to be made, the spun-off company will inherit the parent company's style.

A received security in a spin-off is added to the indexes of its parent effective after the market close the day before the ex-date of the spin-off. Holdings are calculated by multiplying the parent's holdings by the spin-off ratio. This represents the preservation of the previous end-of-day index capitalization, distributed among the spin-off parent and received security.

The new company is reevaluated on its own merits effective after the close on the ex-date. The parent company will also be reevaluated at the same time as the new company. Either or both may move to new indexes, or may drop altogether.

At reevaluation both parent and received company are migrated independently on the day after the ex-date from the parent's index based on each company's capitalization determined at the end of the first day of when issued trading. Banding and Packeting rules are applied, using the breakpoint ranges for each band set at the last ranking. Similar to ranking, all index eligible securities of a company are combined to set a company capitalization, and ineligible securities or securities that fail investability limits for security float (10 percent) or company size (\$10M) are excluded from the CRSP U.S. Equity Indexes.

The following formulas are used to determine the parent's post spin-off start-of-day price and total shares outstanding:

Parent Price

$$P = \left(\frac{P_v}{\text{EventSplitFactor}} \right) - (R_v \times S_r + R_{vi} \times S_{ri} \dots)$$

P_v = Parent price on valuation day

R_v = Received security price on valuation day

S_r = Spin off ratio, in post-split terms

R_{vi}, S_{ri} = Price and ratio for any additional children created from the spin-off

Parent Shares

$$\text{TSOP} = \text{TSO}_v \times \text{EventSplitFactor}$$

TSOP = Parent's TSO

TSO_v = Total Shares Outstanding on valuation day

Received Price

$$R_v = \text{Price of the child received from the exchange at the end of day.}$$

Received Shares

$$R_s = \text{TSOP} \times S_r$$

R_s = Received shares

S_r = Spin off ratio, in post-split terms.

Spin-Offs without When-Issued Trading Prior to the Ex-Date

If a security received in a spin-off does not trade on a when-issued basis before the ex-date, then both the parent and received stock cannot be accurately valued at the start-of-day of the ex-date. In this case, a detached security (dummy) is created after the close of the trading day before the ex-date. The detached security is used as a placeholder until a trade in the spun-off security occurs. The detached security will be added to the same index as the parent security. The detached security will be replaced as soon as an end-of-day trading price for the actual received security is available. Until then, the detached security is kept in the parent's index and its start-of-day price is carried forward. If the parent undergoes a split or reverse split as part of the corporate action, both its start-of-day price and the spin-off ratio are adjusted to account for the split. CRSP uses the following formulas to calculate start-of-day prices for the parent and detached securities:

Parent's Start-of-Day Price (on the ex-date)

$$\text{New Parent Start of Day Price} = \text{Parent End of Day Price}$$

Detached Security's Start-of-Day Price

$$D_sSOD = \frac{\text{Max}((OpSOD - PEOD), 0.01)}{SpR}$$

DsSOD = Detached Security Start-of-Day Price

OpSOD = Original Parent Start-of-Day Price

PEOD = Parent End-of-Day Price

SpR = Spin off Ratio

The example below illustrates what happens when the parent company (Security A) spins off a new company (Security B). Security B had no trades on or before day T and is trading regular way (RW) on the ex-date (T+1).

Security	SOD (T+1) initial	SOD (T+1) Revised at EOD (T+1)	EOD (T+1)	SOD (T+2)
Parent – Security A	\$40	= EOD (T+1) = \$30	\$30	\$30, and reevaluated for new index
Child – Security B	Unknown, no index	Unknown	\$12 trading RW	\$12, and reevaluated for new index
Detached Security B'	\$0, in A's index	= \$40-\$30 = \$10 from A	\$12 from B	Removed

CRSP will not reevaluate companies until there is an opportunity to trade all securities on a regular way basis, with at least one day of notice for any reevaluation results. If the child does not trade regular-way on the ex-date and did not trade when-issued before it, then both companies will be reevaluated at the close on either the day after regular way trading begins or the second trading day after any trading, whichever comes last.

If there are multiple parents distributing one security, or one parent distributing multiple securities, then all the entities involved will be reevaluated at the same time. A company's index eligible securities are kept in the same indexes after reevaluation regardless of whether or not they were involved in the corporate action at hand. If an index ineligible security is distributed as one component of a spin-off and has not traded but can be assigned a derived fair market value, then it can be used to adjust the parent's price and a regular way trade is not needed for reevaluation.

Spin-Off Special Cases

If a company distributes shares of a security already trading in a split-off or partial merger, the event is treated as a spin-off. On the ex-date the holdings received in the parent's index are calculated as in a "standard" spin-off (spinoff terms*parent's holdings). At reevaluation (the business day after the ex-date), the split-off company will migrate from the cap based index with the largest holdings. Note that contrary to the standard migration process, for split-offs CRSP will

determine the starting point of migration based on the largest index capitalization (Price of Split off Entity *Holdings) rather than company capitalization (Price of Split off Entity*Total Shares Outstanding). For example, Company ABC is currently a constituent of the CRSP US Micro Cap Index with holdings of 1M shares. Small Cap Company XYZ splits-off 2M shares of ABC. In this case, ABC will migrate from the CRSP US Small Cap index rather than the CRSP US Micro Cap Index.

Cash Payment/Dividends

Cash Dividend

Cash dividends are corporate actions in which a shareholder receives cash for each share held. Cash dividends are typically scheduled at regular intervals. There is no adjustment to a security's start-of-day price for payments received as cash dividends.

The following unique situations related to Cash Dividends are recognized:

- A dividend paid in a foreign currency where the exchange rate is given by the company is converted into U.S. dollars using the provided exchange rate. If no exchange rate is provided, the dividend amount is converted into U.S. dollars using the spot exchange rate available on the day before, or on, the ex-date.
- A cash dividend with an ex-date on the same day as a stock split will be reported in post-split terms.
- A dividend with a payout amount that is only conditionally approved before the ex-date will not be applied.

Return of Capital

Cash received as a return of capital is treated like a non-ordinary distribution. The security's start-of-day price will be adjusted by the amount of the payment on the ex-date.

Special Cash Dividend

Cash received as a special dividend is also considered to be a non-ordinary distribution. The security's start-of-day price will be adjusted by the amount of the dividend on the ex-date.

Special Dividend (Cash Stock Election)

A special dividend that allows the shareholder to elect to receive cash and/or stock with the proration determined after the ex-date is handled as follows:

- The security's start-of-day price (ex-date) will be adjusted by the cash value of the total special dividend known on the day before the ex-date.
- Index holdings will be adjusted as soon as practicable after the stock/cash proration is disseminated via an official company press release.

Redemptions

Full Call

A full call is the redemption of a security by the issuer (usually prior to the maturity date) at the call (redemption) price. A security that is called and delists from a CRSP exchange of interest is generally removed after the close the last day of trading.

Dutch Tender Offers (Share Repurchase) - effective after the close March 17, 2017

Changes in a security's float resulting from Dutch auctions that represent 5% or more of the security's holdings in the U.S. Total Market Index will generally be implemented on one of the five trading days following the tender offer results announcement*.

If insufficient notice is provided and/or information is not available, the event will be implemented at the next regularly scheduled ranking or upon the application of a non-cap neutral intra-quarter corporate action.

Changes in a security's float resulting from Dutch auctions that represent less than 5% of the security's holdings in the U.S. Total Market Index will be implemented at the next quarterly ranking or upon the application of a non-cap neutral intra-quarter corporate action.

When a Dutch tender offer is implemented, the index holdings are trued-up to the new post-offer shares of the security.

Neutral Capital Structure Events

Stock Dividend

A stock dividend is a distribution of additional shares of stock to existing stockholders. On the ex-date, total and float shares outstanding of the issuing security are increased by the stock dividend rate and index holdings are adjusted accordingly. In other words, a stock dividend is an increase in a company's total shares outstanding accompanied by a corresponding decrease in the price per share.

Forward and Reverse Stock Splits

A forward stock split is an increase in a company's total shares outstanding accompanied by a corresponding decrease in the price per share. A reverse stock split is a decrease in a company's total shares accompanied by a corresponding increase in its stock price. On the ex-date, index holdings are increased or decreased by the split factor. Since the change in shares and stock price are proportional and offsetting, they have no net impact on a company's market capitalization and thus both forward and reverse stock splits as well as stock dividends are considered to be capitalization neutral corporate events.

Chapter 4: CRSP U.S. Industry Sector Indexes

CRSP developed the set of U.S. Industry Sector Indexes listed below in order to highlight industry segment-specific characteristics of all companies included in the CRSP U.S. Total Market Index. To accomplish this objective, CRSP uses Industry Classification Benchmark (ICB®) codes to assign companies to the appropriate industry. CRSP back-tested the methodology for its sector indexes over a six-year period from January 3, 2005 to March 31, 2011.

ICB Industry Identifier	CRSP Index	NASDAQ Symbol	
		Total Return	Price Return
0001	CRSP U.S. Oil and Gas Index	CRSPENT	CRSPEN1
1000	CRSP U.S. Materials Index	CRSPMTT	CRSPMT1
2000	CRSP U.S. Industrials Index	CRSPIDT	CRSPID1
3000	CRSP U.S. Consumer Goods Index	CRSPCGT	CRSPCG1
4000	CRSP U.S. Health Care Index	CRSPHCT	CRSPHC1
5000	CRSP U.S. Consumer Services Index	CRSPCST	CRSPCS1
6000	CRSP U.S. Telecom Index	CRSPTET	CRSPT1
7000	CRSP U.S. Utilities Index	CRSPUTT	CRSPUT1
8000	CRSP U.S. Financials Index	CRSPFNT	CRSPFN1
9000	CRSP U.S. Technology Index	CRSPITT	CRSPIT1
	CRSP U.S. REIT Index	CRSPRET	CRSPRE1
	CRSP U.S. Small Cap ex-REIT Index	CRSPSXT	CRSPSX1

Assigning Securities to the Industry Sector Indexes

Only securities included in the CRSP U.S. Total Market Index are eligible to be assigned to an industry sector index.

Eligibility and investability screens for the industry sector indexes are consistent with those used for other CRSP U.S. Equity Indexes. However, there is an additional eligibility screen for REITs. Mortgage and Timber REITs are not eligible for inclusion in the CRSP U.S. REIT Index.

Eligible securities with a confirmed ICB® code will be assigned to CRSP U.S. Industry Sector Indexes in the following manner:

ICB Industry Identifier	Industry	CRSP Index
0001	Oil & Gas	CRSP U.S. Oil and Gas Index
1000	Materials	CRSP U.S. Materials Index
2000	Industrials	CRSP U.S. Industrials Index
3000	Consumer Goods	CRSP U.S. Consumer Goods Index
4000	Health Care	CRSP U.S. Health Care Index
5000	Consumer Services	CRSP U.S. Consumer Services Index
6000	Telecommunications	CRSP U.S. Telecom Index
7000	Utilities	CRSP U.S. Utilities Index
8000	Financials	CRSP U.S. Financials Index
9000	Technology	CRSP U.S. Technology Index

If an ICB® code cannot be obtained for a specific security, it will not be considered eligible for inclusion in a sector index until one is obtained. If an ICB® code is subsequently obtained, the security will be considered for inclusion in the appropriate sector index at the next regularly scheduled quarterly ranking.

CRSP U.S. REIT Index

In addition to the eligibility and investability screens and ICB® Industry classification, the CRSP U.S. REIT Index applies a further restriction on specific REIT types. Mortgage and Timber REITs are excluded from the CRSP U.S. REIT Index.

As is the case with its other industry sector indexes, CRSP utilizes the ICB® code assigned to each security to determine eligibility for the CRSP U.S. REIT Index. The ICB® codes listed in the table below are included in the CRSP U.S. REIT Index. Mortgage REITs (ICB® code of 8676) and Timber REITs (a subset of the Specialty REIT classification, ICB® code of 8675) are not eligible for inclusion in the CRSP U.S. REIT Index but may be included in other CRSP indexes.

ICB® codes eligible for CRSP U.S. REIT Index:

ICB® Subsector Identifier	REIT Classification	CRSP Index	NASDAQ Symbol	
			Total Return	Price Return
8671	Industrial & Office	CRSP U.S. REIT Index	CRSPRET	CRSPRE1
8672	Retail			
8673	Residential			
8674	Diversified			
8675*	Specialty			
8677	Hotels and Lodging			

*included if not a Timber REIT

The methodology for the CRSP U.S. REIT Index was backtested for a 10-year period between January 2, 2001 and March 30, 2011. A subsequent backtest was later run using June 29, 2001 as the start date in order to better align the U.S. REIT Index with CRSP's other index families.

Additions and Deletions to the CRSP U.S. REIT Index

If an index constituent of the CRSP U.S. REIT Index becomes ineligible for the index due to loss of REIT status or change of REIT type, or a security not a member of the CRSP U.S. REIT Index becomes eligible due to change in REIT status or change of REIT type, no change is made in REIT index eligibility at the time of the announcement or filing; rather, the security will be reviewed and added or removed, if appropriate, at the next ranking.

Internal Revenue Code (25/50) Concentration Constraints

The CRSP U.S. Industry Sector Indexes comply with the Internal Revenue Service concentration rules required for a company to qualify as a Regulated Investment Company (RIC). These rules state that at the end of each quarter, a RIC must meet the following constraints:

- No more than 25 percent of the value of the RIC's assets may be invested in a single issuer.
- The sum of the weights of all issuers representing more than 5 percent of the total assets should not exceed 50 percent of the fund's total assets.

In order to minimize unnecessary turnover, CRSP created buffers around the IRS' concentration constraints with the goal of allowing some limited, but typical, movement of prices between ranking and reconstitution, while also remaining compliant with the IRS' rules. Consequently, CRSP sets its holdings constraints to:

- No more than 22.5 percent (maximum company buffer) of the value of the index's capitalization may be represented by a single issuer.
- The sum of the weights of all issuers representing more than 4.9 percent (larger company buffer) of the total index capitalization should not exceed 45 percent (concentration buffer) of the index's total capitalization.

A “least squares” approach is used to minimize any changes to company weights within an index. This method favors small changes to a larger set of companies over larger changes to a smaller set of companies. Because even small changes are relatively big for very small companies, CRSP includes the additional constraint that, if possible, the ratio of the new weight to the old weight for any one company can never exceed a ten-to-one ratio.

The first step in using a least squares approach is to calculate the constrained weights through a non-linear optimization that minimizes the squared difference between each company’s ideal weight (\bar{w}_i), or the weight based on the security’s holdings before the concentration constraint is applied, and its constrained weight (w_i), $\sum_{i=1}^N (\bar{w}_i - w_i)^2$, subject to the following three criteria:

1. The total summation of all company weights within an index must equal a value of one:

$$\sum_{i=1}^N w_i = 1$$

2. The weight for a specific company must fall between zero and the maximum company buffer:

$$\text{for all } i, 0 \leq w_i \leq 22.5\%$$

3. The total weight of companies above the large company buffer should not exceed the concentration buffer:

$$\text{where } w_i > 4.9\%, \sum w_i \leq 45\%$$

The second step first determines whether the maximum ratio of the constrained weight to the ideal weight does not exceed 10 ($\max(\frac{w_i}{\bar{w}_i}) > 10$). If it does, then the optimizer is run again with the following two additional constraints:

The number of large companies (where $w_i > 4.9\%$) is not allowed to change.

The maximum ratio is 10:

$$\text{for all } i, \frac{w_i}{\bar{w}_i} \leq 10$$

The third step is to calculate the concentration limit multiplier (CLM) that is used to adjust index holdings. By convention the CLM is set such that the maximum value is one, and all others are adjusted proportionately, $\frac{w_i}{\bar{w}_i} * \min(\frac{\bar{w}_i}{w_i})$. The multiplier used for a company at reconstitution to meet compliance remains in effect until the next ranking period, unless there is a corporate action as detailed below. All holdings changes during the quarter are adjusted by the CLM.

CRSP reviews compliance of all sector indexes at ranking, daily during the pro forma period, on compliance days, and upon the application of a qualifying corporate action type.

Compliance Days

IRS 851(a)(3) further requires that index holdings be compliant at fiscal quarter-end. To comply, CRSP has set compliance dates of the last trading day of March, June, September, and December. Compliance checks are completed by 1:30 p.m. CST on the trading day before the compliance day and are based on the trading day’s start-of-day prices adjusted for the compliance day basis and projected compliance day index holdings. If an index is found to be out of compliance, a modified holdings adjustment process is used. This process involves rebalancing the index with ideal weights based on concentration multipliers set at the last ranking. The index is again optimized to the more stringent CRSP buffers.

Corporate Actions

Any stock received from a security held in the index inherits the concentration multiplier of the distributing security until reevaluation or the next ranking.

The following corporate action situations will trigger a review of compliance:

- **Fast-track IPO:**
An IPO which is large enough to qualify as fast-track (added to a sector index intra-quarter) will, if necessary, trigger an entire index rebalance. For a constrained index, all securities, including the fast-track IPO security, are assigned weights based on index holdings unadjusted by the previously assigned concentration multiplier. This result is reviewed for compliance with the IRS's 25/50 constraints. If an index fails to meet the requirements, then the entire index is rebalanced to comply with the IRS's constraints, with the smaller buffers set to 24.5%/49% (4.95%).
- **Effective after the close March 17, 2017:** Constrained indexes will attempt to place new securities without fully re-optimizing the index if all of the new securities are less than the size of the Large Cap lower breakpoint. The index is re-optimized as if all securities are to be adjusted, but only the weights of the new securities are considered. Their holdings and concentration multiplier are set to keep the target weight, leaving other securities at the same holdings and multipliers.
- **Spin-off** – In the case of a spin-off in which the parent or spun-off child is newly added to a sector index, the index is rebalanced as for Fast-track IPOs.
- **Merger** – In the case of a merger that results in a new company being added to a sector index different from its parents, the index will be rebalanced as for IPOs.

The following corporate action situations will not trigger a review of compliance:

- **Spin-off when both parent and child securities are held in the same sector index:** If the child is added after reevaluation to the same sector index as its parent, then the reevaluated security inherits the concentration limit multiplier of the parent (weighted by the post spin-off entities' now smaller caps).
- **Two parents in the same sector index spin-off one child:** Each parent maintains its own concentration limit multiplier while the child inherits a weighted market cap average of the parents' concentration limit multipliers.
- **Stock merger within the same sector index:** If a company acquires another company in the same sector index (or two companies in the same sector index merge), and shares of the acquirer are issued to the shareholders of the target, then the concentration multiplier of the surviving company is set to the weighted average of the concentration multiplier of all participants in the merger.
- **Merger within the same sector index that produces a new company:** The new company is reevaluated using the same rules as for reevaluated spin-offs, using the original sector and concentration multipliers of the non-surviving companies.

Quarterly Maintenance

Ranking and Reconstitution

The CRSP U.S. Industry Sector Indexes are fully reviewed on a quarterly basis, following the same schedule and process as all CRSP U.S. Equity Indexes. See also Chapter 3: General Index Maintenance – Quarterly Maintenance for ranking schedule and Chapter 2: General Index Construction for more information on the reviews and process undertaken at each ranking. Additionally, changes in a security's industry sector intra-quarter not attributed to a corporate action which involves reevaluation will be implemented at ranking. If a security is reclassified from one industry sector to another, it is moved 100 percent to its newly assigned sector. CRSP does not apply the concept of packeting to its U.S. Industry Sector Indexes. Newly eligible or ineligible securities will also be reviewed, and added or removed if necessary, at ranking.

IRS 25/50 Compliance at Ranking

At each ranking CRSP proactively adjusts weights in the initial pro forma indexes to satisfy the more stringent buffer limits, even if the IRS limits are not violated. If weights in the pro forma index violate the IRS limits at any time during the two week pro forma period (i.e., after ranking day but before reconstitution day), the index is rebalanced so as to meet the more stringent CRSP buffer limits.

Prices used for determining a company's compliance weight on ranking day are the end-of-day prices on the ranking day. Prices used for validating continued compliance of pro forma indexes during daily maintenance in the pro forma period are the start-of-day prices on each trading day during the pro forma period.

IRS 25/50 Compliance with Transitional Reconstitution – effective with September 2017 Ranking

At each ranking CRSP proactively adjusts weights in the initial pro forma indexes to satisfy the more stringent buffer limits, even if the IRS limits are not violated. Pro forma indexes are checked each day for compliance against the 25/50 concentration rule. If the check fails, the pro forma index is re-optimized during the transition period. The primary index is not checked for compliance, but will continue transitioning to a new target beginning the following trading day if the pro forma was changed. If any security in the primary or pro forma index is constrained due to concentration limits, then a new concentration limit multiplier is calculated as the ratio of the post-transition holdings of the constrained index to the post-transition holdings of its unconstrained index.

Daily Maintenance during Pro Forma Ranking Period

If a corporate action causes a holdings true-up, the primary and pro forma holdings are set to the same unconstrained holdings and then the constrained holdings are calculated by multiplying by their respective concentration limit multipliers.

Effective after the close March 17, 2017: A new security with a target weight in a constrained pro forma index will be added in the primary index at the holdings that produce that target weight, with no change in holdings to existing constituents.

Transitional Reconstitution - effective with September 2017 Ranking

If a security is a member of the pro forma but not a member of the primary index, or vice versa, then index holdings are transitioned from zero, or to zero, similar in nature to all other CRSP U.S. Equity Indexes. If a security is added to a primary and pro forma index at the same time during transition, as for a fast-track IPO or reevaluation into a new index, then securities are added to unconstrained versions of the indexes at the full holdings on the day processed. The pro forma index is then re-optimized, if necessary. Then the new security is added to the primary index at the holdings that produce the same weight as in the re-optimized pro forma index.

Daily Maintenance

Corporate Actions

Corporate actions and security additions and delistings are researched and applied in the same manner as in all CRSP U.S. Equity Indexes. In the case of a spin-off, if the spun-off entity's industry classification code is unknown or unavailable by the effective date, the spun-off entity will inherit the parent's industry classification. If the spun-off entity's industry classification code becomes available after the ex-date of the spin-off, the company will remain in its current index until it is reviewed at the next regularly scheduled ranking.

IRS 25/50 Compliance during Daily Maintenance

Weighting and concentration limit multipliers must be maintained when corporate actions or other daily maintenance events impact the composition of a sector index. As mentioned above, sector indexes will be checked for compliance and rebalanced if necessary in the case of a fast-track IPO, spin-off parent or child company, or survivor merger that results in a new company being newly added to a sector index. All other cases will not cause an immediate review of compliance.

Chapter 5: CRSP U.S. Value and Growth Style Indexes

The CRSP U.S. Value and Growth Style Indexes are part of the investable series of indexes offered by CRSP. Once a security is assigned to a cap-based index, it is evaluated using CRSP's multifactor "style" model to determine its placement in a value or growth index for its specific size. Micro Cap companies are not eligible for inclusion in the CRSP U.S. Value and Growth Style Indexes.

CRSP U.S. Value and Growth Style Indexes currently offered:

Index Name	NASDAQ Symbol	
	Total Return	Price Return
CRSP US Mega Cap Value Index	CRSPMEVT	CRSPMEV1
CRSP US Large Cap Value Index	CRSPLCVT	CRSPLCV1
CRSP US Mid Cap Value Index	CRSPMIVT	CRSPMIV1
CRSP US Small / Mid Cap Value Index	CRSPSMVT	CRSPSMV1
CRSP US Small Cap Value Index	CRSPSCVT	CRSPSCV1
CRSP US Mega Cap Growth Index	CRSPMEGT	CRSPMEG1
CRSP US Large Cap Growth Index	CRSPLCGT	CRSPLCG1
CRSP US Mid Cap Growth Index	CRSPMIGT	CRSPMIG1
CRSP US Small / Mid Cap Growth Index	CRSPSMGT	CRSPSMG1
CRSP US Small Cap Growth Index	CRSPSCGT	CRSPSCG1

Constructing the CRSP U.S. Value and Growth Style Indexes

Construction of the value and growth indexes is done in concert with the construction of the market cap-based indexes. Value and growth style determination involves completing the following three additional steps for each market-cap segment at each ranking:

1. Calculate the value and growth style factors for each security within a market-cap segment. See Appendix C for detailed definitions and calculations.
2. Combine multiple style factors into a single composite factor (the score that is used to place the security), separately for value and growth. This will be the score used to assign a security to either a value or growth index.
3. Rank scores and assign securities to their appropriate value and growth indexes.

Defining Value and Growth Style Indexes

CRSP employs a multi-factor model when classifying securities to their appropriate value or growth indexes. This multi-factor model capitalizes on the five value and six growth factors listed in the following section. CRSP is the first index provider to use the investment rate (INV) and the return on assets ratios (ROA) as growth factors when determining a company's style placement.

Value Factors Used in Multi-factor Model

1. Book-to-Price Ratio (BP)
2. Future Earnings-to-Price Ratio (FEP)
3. Historical Earnings-to-Price Ratio (HEP)
4. Dividend-to-Price Ratio (DP)
5. Sales-to-Price Ratio (SP)

Growth Factors Used in Multi-factor Model

1. Future Long-term Growth in Earnings Per Share (FLGE)
2. Future Short-term Growth in Earnings Per Share (FSGE)
3. 3-year Historical Growth in Earnings Per Share (HGE)
4. 3-year Historical Growth in Sales Per Share (HGS)
5. Investment-to-Assets Ratio (INV)
6. Return on Assets (ROA)

Steps for Combining Multiple Style Factors into Single Composite Growth Score and Single Composite Value Score

1. For each company, determine values for the various style factors.
2. Winsorize the data for each style factor at the 5th and 95th percentiles.
3. Calculate each style factor's cross-sectional mean and cross-sectional standard deviation.
4. Scale each style factor for each company by finding the factor's z-score according to the following formula:

$$\text{z score} = \frac{\text{company factor} - \text{cross sectional mean for factor}}{\text{cross sectional standard deviation for the factor}}$$

The z-score factors are denoted by the presence of a “z” before the factor acronym (e.g. zBP).

5. Compute the single Composite Style Score (CSS) for each company by weighting the z-scores of the underlying factors according to the following methods:

Calculating Value Composite Style Score:

When determining the Value CSS, CRSP's model first combines the future and historical earnings-to-price ratios (FEP and HEP) into a single earnings-to-price factor (EP), which is then combined with the book-to-price ratio (BP) to create a primary value superfactor (V1). The sales-to-price ratio (SP) and dividend-to-price ratio (DP) are then combined to create a secondary value superfactor (V2). Merging the two value superfactors together creates a single composite value score (V), as defined below:

$$\text{Value Score (V)} = (2/3 \times \text{V1}) + (1/3 \times \text{V2}), \text{ where:}$$

$$\text{V1} = (2/3 \times \text{zEP}) + (1/3 \times \text{zBP}) \text{ with } \text{zEP} = (2/3 \times \text{zFEP}) + (1/3 \times \text{zHEP}), \text{ and}$$

$$\text{V2} = (2/3 \times \text{zSP}) + (1/3 \times \text{zDP})$$

Calculating Growth Composite Style Score:

When determining the Growth CSS, CRSP calculates a future growth superfactor (FG) based on analysts' estimates of future long-term growth in earnings (FLGE) and future short-term growth in earnings (FSGE), as well as the investment rate (INV) and return on assets (ROA). Additionally, a historical growth superfactor (HG) is calculated based upon 3-year historical growth in earnings (HGE) and 3-year historical growth in sales (HGS). Once determined, these two growth superfactors are combined to create a single composite growth score (G) as defined below:

$$\text{Growth Score (G)} = (2/3 \times \text{FG}) + (1/3 \times \text{HG}), \text{ where:}$$

$$\text{FG} = (1/3 \times \text{zFLGE}) + (1/3 \times \text{zFSGE}) + (1/6 \times \text{zINV}) + (1/6 \times \text{zROA}), \text{ and}$$

$$\text{HG} = (2/3 \times \text{zHGS}) + (1/3 \times \text{zHGE})$$

See also [Appendix D](#) for a Value and Growth Factors diagram.

Note on Missing Values

For all cases where a composite factor is generated with a data point missing, the weight for the missing data point is distributed proportionally across the remaining factors. A minimum of two value and two growth factors are required to generate value and growth scores.

Creating Style-Based Indexes Using the Rank Approach

CRSP assigns each composite score a rank value (RV for Value and RG for Growth) that represents a certain percentage of the cumulative market cap with lower scores. The RG value is inverted and the scores are averaged with the RV value to arrive at what is termed an average rank (AR) for each security. A security with a high AR, or mean score above 0.5, is categorized as value, while a security with a low AR, or mean score below 0.5, is categorized as growth.

There is little agreement on exact definitions of value and growth or when exactly securities switch between value and growth, therefore CRSP applies its rules for packeting and migration to the CRSP U.S. Value and Growth Indexes as well. As with the market capitalization-based indexes, band thresholds are set to cushion movement between styles.

Details for calculation of the value and growth style indexes:

1. Rank stocks separately by both their value composite style scores (CSS = V) and growth composite style scores (CSS = G).
2. Assign a rank composite style score (RCSS) to each security, calculated as follows:

In general, $RCSS = M1/M2$, where:

- For value (CSS = V), M1 is the total market capitalization of all companies that are constituents of a specific capitalization-based index with a CSS lower than the particular company's CSS, plus half of its own market cap (RCSS = RV).
- For growth (CSS = G), M1 is the total market capitalization of all companies with a CSS higher than the particular company's CSS, plus half of its own market cap (RCSS = RG).
- M2 is the total market capitalization of all companies within its cap-base universe.

Thus, each company's RCSS corresponds to the market-cap adjusted percentile of its CSS within its cap-based universe. This value falls between 0 and 1. Therefore, for rank value (RV), the security with the highest value will have a score equal to 1 while the security with the lowest value will have a score equal to 0. The reverse is true for rank growth (RG) – the security with the highest growth will have a score equal to 0 and the security with the lowest growth will have a score equal to 1.

3. Compute average rank (AR) for each security according to the formula below. AR scores range from 0 to 1 with higher numbers indicating higher “value” attributes and lower numbers indicating higher “growth” attributes.

$$AR = \frac{RV + RG}{2}$$

4. Assign newly added securities to value or growth categories according to their AR scores:
 - Securities with an $AR > 0.5$ are classified as 100 percent value
 - Securities with an $AR \leq 0.5$ are classified as 100 percent growth

To visualize this procedure, the following figure plots RV and RG scores for a hypothetical stock. AR scores greater than 0.5 represent points above the main diagonal while AR scores less than 0.5 represent points below the main diagonal.

Quarterly Maintenance

Quarterly Ranking and Reconstitution Process

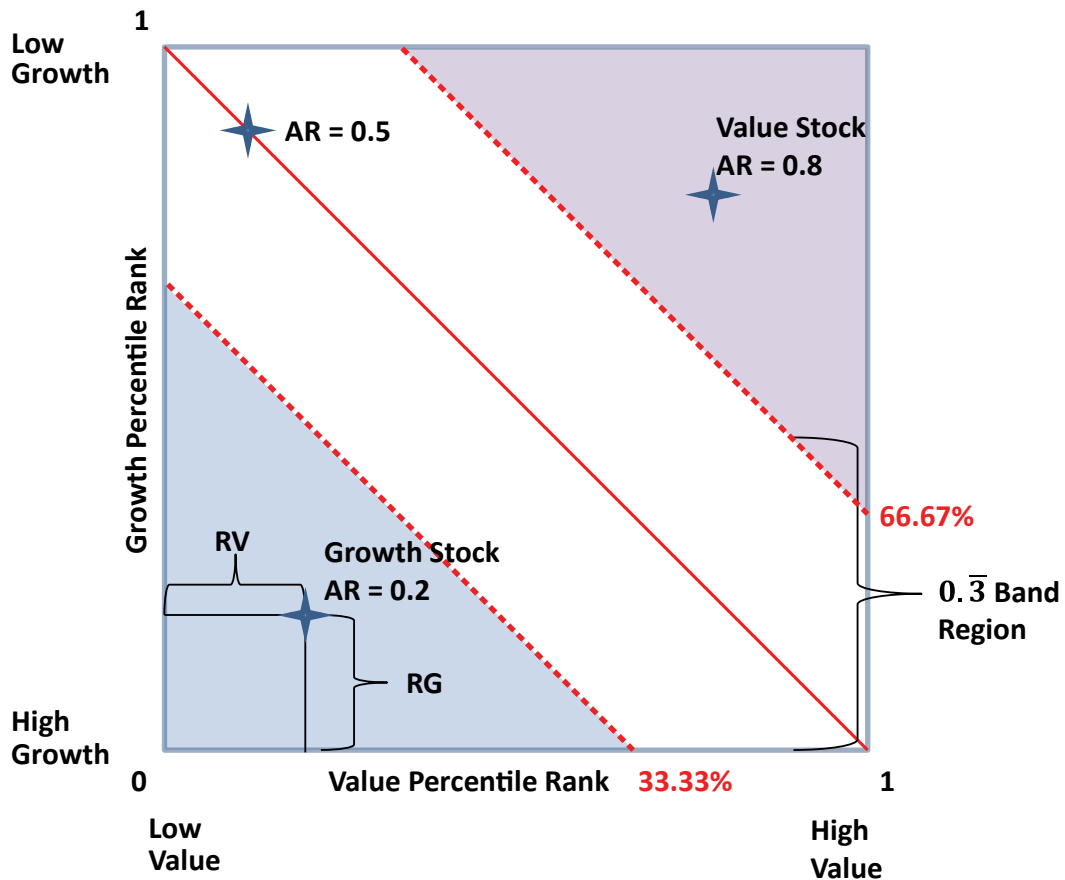
The CRSP U.S. Value and Growth Style Indexes are fully reviewed on a quarterly basis, following the same schedule and process as all CRSP U.S. Equity Indexes. See also [Chapter 3: General Index Maintenance – Quarterly Maintenance](#) for ranking schedule and [Chapter 2: General Index Construction](#) for more information on the reviews and process undertaken at each ranking.

Migration with Packeting

As with the capitalization-based indexes, CRSP applies its packeting and migration procedures to the U.S. Value and Growth Style Indexes. For these, however, CRSP centers the band around an AR score of 0.5 and sets the threshold band width at 33.33 percent of AR. This means that securities with an AR between 33.33 and 66.67 percent are considered to be inside of the band. Once a security crosses through the band between its current style and the adjacent style core, 50 percent of its holdings are moved. If the security stays beyond the threshold in the following ranking period, the remaining 50 percent will be moved. Therefore, a security may be partially held in both a value and a growth index. It is also possible for the same security to be classified differently in different market cap-based indexes depending on the characteristics it displays in each segment. In other words, a security may be classified as value in one cap-based index and as growth in another cap-based index, depending on its AR score within each market-cap segment.

Daily Maintenance

IPO Methodology for Value and Growth Style Indexes



When an IPO security is added to a cap-based index, it will be assigned to a corresponding style index. To assign an IPO to a value and/or growth index, CRSP will use fundamental and estimates data from CRSP's data sources. A minimum of two growth factors are required to generate a growth score and a minimum of two value factors are required to generate a value score. If complete data is not available from CRSP's data sources, CRSP will first use a set of modified calculations that accept annual rather than quarterly data. If vendor data is not available, CRSP will review prospectuses to manually determine the values necessary to generate growth and value scores.

New Methodology - effective after the close March 17, 2017

If a company's size is lower than the Large Cap lower breakpoint (85%), or a style cannot be assigned for an added company, it will be set to 50% in Value and 50% in Growth in corresponding style indexes for each size index it is added. As soon as an AR score can be calculated at a ranking, the company will move to the Value or Growth index as if it was new.

Spin-off Methodology for Value and Growth Style Indexes

After completion of a spin-off, both the parent and child are reevaluated independently and moved, if necessary, to new cap-based indexes. At this time, they are also reevaluated and added to the value and/or growth indexes corresponding to their respective cap-based size assignments. For style index assignment, CRSP uses fundamental and estimates data reported on a post-spin-off basis and scores the resultant companies relative to their respective peers using the data available on the ranking day immediately prior to the event. In the case where there is insufficient data available from CRSP's standard sources or in its other databases for scoring a security post-spin-off, then the resultant companies inherit the style of the parent company based on the following rules:

1. If the reevaluated (post spin-off) parent or spun-off child remain in the same cap-based indexes, then the allocation between style and growth within that market-cap segment does not change. For example, if before a spin-off, the parent security is allocated 100 percent to Large Growth and 100 percent to Mid Value then, after the spin-off, the parent and spun-off child will still be allocated to the respective CRSP style indexes in the same proportion as the pre-spin-off parent.
2. If either the reevaluated (post spin-off) parent or the spun-off child moves to a new cap-based index, and the parent's style before the spin-off was different within another market cap-based index, then the resulting company is allocated 50 percent to value and 50 percent to growth. For example, if before a spin-off, the parent security is allocated 100 percent to Large Growth and 100 percent to Mid Value, but the post spin-off securities move entirely to the Small Cap Index, then both the parent security and the spun-off security will be allocated to 50 percent Small Value and 50 percent Small Growth.

Chapter 6: Announcement Policies

Ranking Procedure and Ranking Results

Announcements regarding ranking procedures and results are made available to index subscribers via the CRSP secure index website at 6:00 a.m. CST on the first trading day following the ranking day (i.e., the first trading day after the first Friday of March, June, September, and December).

A two month notice will be given prior to making a change in the ranking schedule.

Restatement

As a general policy, if an error causes an index to move by three basis points, CRSP will review and determine if an index restatement is required. If a restatement is required, users will be notified through the appropriate communication channels.

For further information refer to the [CRSP Restatement Policy & Guidelines](#) document which is available on the CRSP website.

Exchange Closures

If the CRSP exchanges of interest close due to unforeseen circumstances, CRSP will not produce index results for that day. Instead, the index levels will continue from the last complete day of trading.

If the closing is known at least one day in advance, corporate actions originally declared effective after the close of the “closed” day will be made effective after the close of the day that markets reopen. Index holdings will be carried forward from the end of the day prior to the closed date. Scheduled index notifications will occur on the trading day before the closing.

All corporate actions declared effective on a closed day or the first day after reopening which impact the security universe will be re-dated to the day after trading resumes. Changes to index holdings will take place after the close of the day trading resumes.

If there is an unexpected market closure during transition, transition will be extended accordingly.

Chapter 7: Index Governance

CRSP's Index Governance Committees are comprised of four committees: **Oversight Committee**, **Index Advisory Council**, **Index Domicile Eligibility Committee**, and **Index Operating Committee**.

The **Oversight Committee** is composed of CRSP employees and is responsible for the governance and oversight function. It reviews and approves material changes to the index methodology as well as all stages of the index determination process to ensure that the integrity of all CRSP Indexes is maintained.

The **Index Advisory Council** is composed of CRSP employees, Booth School of Business faculty advisors and representatives from the financial service industry. It provides guidance with respect to the construction, methodology and maintenance of the indexes. It is consulted for input and advice to ensure the relevance of the CRSP Indexes, and to ensure that the indexes meet the needs of CRSP's clients.

The **Index Eligibility Committee** is composed of CRSP employees. The Committee is responsible for reviewing securities whose eligibility is indeterminate after applying eligibility rules both at ranking and following the application of a corporate action.

The **Index Operating Committee** is composed of CRSP employees with extensive relevant operational experiences. This committee is responsible for ad hoc review of unusual corporate actions and immediate operational issues.

Chapter 8: Terms Glossary

Terms	Definition
Bands	Capitalization bands: Different percentage thresholds straddling each capitalization-based index breakpoint. Style bands: Different percentage thresholds straddling the value/growth breakpoint. Bands are considered by CRSP when reevaluating a company's index placement in terms of total capitalization or style.
Capitalization-based indexes	Indexes developed to represent capitalization-based size-specific characteristics of companies.
Cap-neutral corporate action	A corporate action that does not change the capital structure of the company is considered cap-neutral. Examples include stock dividends and stock splits.
Cash dividend	An event in which shareholders receive cash for each share held (typically scheduled at regular intervals).
Compliance days	Last trading day of March, June, September, and December required to comply with the IRS (25/50) concentration constraints.
Compliance rebalance	CRSP checks the sector index holdings compliance per the IRS (25/50) concentration constraints and optimizes index constituent weights if needed. Compliance rebalances occur on compliance days, or can be triggered by a fast-track IPO, spin-off or merger defined by the CRSP methodology.
Concentration limit multiplier	A ratio that adjusts the index holdings to satisfy the IRS (25/50) concentration constraints.
Corporate action	An event initiated by a company which impacts its shareholders. Examples include cash dividends, distributions, mergers, spin-offs, stock buybacks, and stock splits.
CRSP exchange of interest	NYSE, NYSE MKT, ARCA, and NASDAQ.
Effective float factor	A security's float factor rounded to the nearest five percent.
EIN	Employer Identification Number (EIN) is a unique nine-digit number assigned by the IRS to business entities operating in the U.S. for the purpose of identification.
End-of-day price	Official closing price for a security on its primary listing exchange. If the primary exchange price is not available, price is assigned in a specific order of precedence as defined by CRSP end-of-day price methodology.
Exchanges/Conversions	A mandatory swapping of one security for another security of the same company. For example, a preferred stock is converted into a common stock or one class of security is exchanged for another class.
Ex-distributed trading	A period of conditional trading with deferred settlement, when a security is traded with post-event rights before the event is effective, at the same time that the original security is trading regular way in its pre-event state.
Fast track IPO	An IPO, which passes a specific company capitalization threshold, that is added to CRSP indexes prior to a ranking.
Float factor	The ratio of float shares outstanding to total shares outstanding, expressed as a percentage.
Float shares outstanding	The number of shares of a security outstanding that are freely available for trading by the public.

Terms	Definition
Float-adjusted market capitalization	A security's index holdings multiplied by the security's price (used to determine a security's weight within an index).
Forward stock split	An increase in a company's total shares outstanding accompanied by a corresponding decrease in the price per share.
Full call	The redemption of a security by the issuer (usually prior to the maturity date) at the call (redemption) price.
Holdings	The number of shares held in a CRSP index, calculated by multiplying security's total shares outstanding by its effective float factor as well as other index-specific multipliers.
ICB	Industry Classification Benchmark (ICB) is a classification system that allocates companies to the subsector whose definition closely describes the nature of its business as determined from the source of its revenue or the source of the majority of its revenue.
Industry sector indexes	Indexes developed to represent industry sector-specific characteristics of companies. For example, the finance or oil & gas industry.
Investability	Characteristics of a security in terms of liquidity, defined by the CRSP index investability rules.
Market cap	The market value of a company's outstanding shares.
Market impact	The extent to which the buying or selling of securities moves the price
Merger/Acquisition	An event in which two or more companies are combined into one, creating a new entity.
Migration	A security's movement across various capitalization-based or style breakpoints and associated indexes, applying CRSP packeting and migration rules.
Multipliers	Certain multipliers exist for size, style, and sector indexes to enforce shared holdings due to migration or to change holdings in order to satisfy legally-mandated IRS concentration constraints, such as concentration limit multiplier (CLM).
Non-cap neutral corporate action	A corporate action that changes the capital structure of the company. Examples include mergers, spin-offs, and secondary offerings.
Non-transferable	A security, property or right that does not trade on any public exchange.
Packet	In general, 50 percent of the index's total holdings of a company.
Packeting	Movement between indexes by a packet, in general 50% of an index's total holdings of a company.
Price impact	The correlation between an incoming order (to buy or to sell) and the subsequent price change
Primary index	The current index as distinguished from a pro forma index that exists concurrently during a ranking period.
Pro forma adjustment period	Time period after ranking during which CRSP will review challenges to the pro forma assignments. This is generally up to the Friday after the ranking day.
Pro forma period	The time between the ranking and reconstitution date, currently 10 days, unless a holiday occurs. As of September 2017, the pro forma period will be 12 days.
Pro forma index	The announced but not applied composition of the CRSP indexes on a ranking date. On the final transition date, the pro forma index will become the regular/standard index for the upcoming quarter.
Ranking	An activity where CRSP index constituents are reviewed quarterly. CRSP ranking dates are after the close of the first Friday of March, June, September, and December.
Rebalancing	Another term used to describe reconstitution.

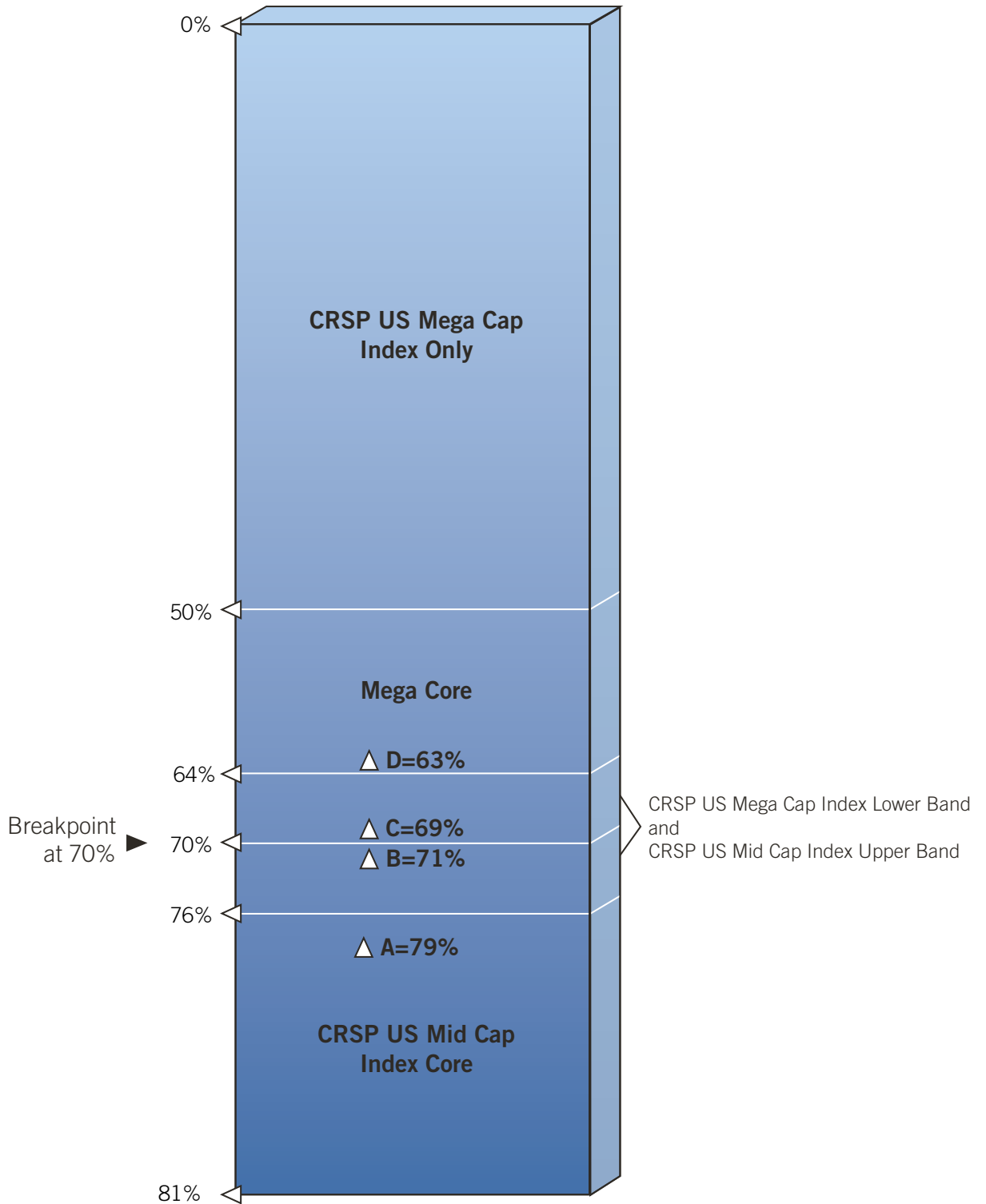
Terms	Definition
Received stock	Received Stock is a neutral distribution of stock of another security. New holdings of the distributed security are added to the indexes of the distributing security at the rate of the distribution multiplied by the initial holdings of the distributing security. The added holdings either add the security to the index or add to existing holdings of a security already in the index. All spin-offs have Received Stock, at least on the ex-date. Mergers require Received Stock only when the acquired security is removed from indexes before a reevaluation is done.
Reconstitution	CRSP pro forma index constituents and holdings replace the standard/regular index constituents and holdings.
Reevaluation	The reconsideration and reapplication of CRSP index rules to a company. Examples include index eligibility, investability, and market capitalization methodologies. Typically reevaluation occurs intra-quarter after a spin-off, or merger if the resulting company meets the capitalization threshold defined by the CRSP U.S. Equity Indexes methodology.
Regular way trading	A type of trade that is settled through the regular settlement cycle (three days after the trade date (T+3)).
Reverse merger	Any merger in which the surviving entity originates from outside of CRSP's security universe.
Reverse stock split	A decrease in a company's total shares outstanding accompanied by a corresponding increase in the price per share.
Rights distribution	An event in which current shareholders are given the option to buy, within a certain period of time, a specified number of additional shares from the company at a specific price, usually below the current market price.
Rights ratio	The number of rights received per share owned in a rights distribution.
Secondary exchange	All stock exchanges excluding NYSE, NYSE MKT, ARCA, and NASDAQ. Examples include Pink Sheets, foreign exchanges, or small, regional exchanges.
Secondary offering	An event where company or stagnant shareholder sells shares to the public after the company's initial public offering.
Spin-off	The creation of an independent company through the distribution of new shares of an existing business or division/subsidiary.
Split factor	Ratio of the number of new shares received to old shares held in a forward or reverse stock split.
Start-of-day price	Previous day end-of-day price adjusted for all splits and nonordinary distributions, such as special dividends, rights distributions, or spin-offs.
Stock dividend	A distribution of additional shares of stock to existing stockholders.
Style indexes	Indexes developed to represent the value or growth characteristics of companies, as defined by CRSP's multifactor style model.
Subscription ratio	The number of shares that can be purchased per right owned.
Tender offer	An external or internal offer made directly to a firm's shareholders to buy their stock at a specified price, usually at a premium over the prevailing market price.
Total shares outstanding	All of the shares of a specific class of a company's equity securities that are issued and outstanding.
Transition Day	One of five days when holdings are moved from the current index to the target pro forma holdings.
Transitional Reconstitution	Transitional reconstitution moves 20% of the change in holdings each day during a 5-day period from the current index to the target pro forma index.

Terms	Definition
When-distributed trading	A period of conditional trading with deferred settlement, on shares of a security affected by a prorated offer awaiting final allotment of post-offer shares to individual shareholders, at the same time the original shares are trading regular way.
True-up	A True-up is an index action that synchronizes index holdings of a security with its latest shares data. Effective Float Factor is recalculated as the Float Shares Outstanding divided by the Total Shares Outstanding, rounded to the nearest 5%. The holdings are then set to the Total Shares Outstanding multiplied by the recalculated Effective Float Factor and relevant index multipliers.
When-issued trading	A period of conditional trading of a new security with deferred settlement. It typically takes place in securities which are due to be listed or admitted to trading on one of CRSP's exchanges of interest.
Winsorize	The transformation of statistics by limiting extreme values in the statistical data to reduce the effect of possibly spurious outliers.

Appendix A: Migration Examples

Cap-based Migration Examples

In the interest of making the CRSP cap-based methodology clear, examples are provided which refer to the diagram below. The diagram makes use of two adjacent indexes: Mega and Mid. The breakpoint is set at 70% of cumulative market cap and the band range is from 64% to 76%. Examples assume a quarterly ranking/reconstitution. In this example, the CRSP U.S. Large Cap Index is ignored for sake of clarity.



Example 1: Company moves from B in Q1 to C in Q2, to D in Q3, and stays at D in Q4.

Q1 state:

Company is ranked at 71% (point B).

It is on the Mid-Cap Index side of the breakpoint and was not previously in the adjacent Mega-Cap Index. Therefore, the company is allocated 100% to the Mid-Cap Index.

Q2 state:

Company is ranked at 69% (point C).

Since the company remains in the band, no movement occurs. Therefore, it is still allocated 100% to the Mid-Cap Index.

Q3 state:

Company is ranked at 63% (point D).

The company has crossed the 64% threshold into the Mega-Cap Index core. Therefore, one 50% packet is moved from Mid-Cap to Mega-Cap. Therefore it is now allocated 50% to Mid-Cap and 50% to Mega-Cap.

Q4 state:

Company is still ranked at 63% (point D).

Since the company has remained in the Mega-Cap core for two consecutive quarters, its second 50% packet is moved from Mid-Cap to Mega-Cap, resulting in a new 100% allocation to the Mega-Cap Index.

Example 2: Company moves from D in Q1 to A in Q2, stays at A in Q3, then moves to B in Q4, to D in Q5, and to A in Q6.

Q1 state:

Company is ranked at 63% (point D).

The company originally starts in the Mega-Cap core and is allocated 100% to the Mega-Cap Index.

Q2 state:

Company is ranked at 79% (point A).

The company crosses the breakpoint and is now located beyond the band adjacent to the Mid-Cap core. Therefore, one 50% packet is moved. As a result, 50% of the company is allocated to the Mega-Cap Index and 50% is allocated to the Mid-Cap Index.

Q3 state:

Company remains at 79% (point A).

Since the company remains in the Mid-Cap core, its second 50% packet is moved, resulting in a new 100% allocation to the Mid-Cap Index.

Q4 state:

Company is ranked at 71% (point B).

Because the company's AR score is still in the band adjacent to the Mid-Cap core, it maintains its 100% allocation in the Mid-Cap Index.

Q5 state:

Company is ranked at 63% (point D).

The company crosses beyond the breakpoint and 64% threshold of the adjacent band into the Mega-Cap core. Consequently, one 50% packet is moved and allocated to the Mega-Cap Index; the other 50% packet remains allocated to the Mid-Cap Index.

Q6 state:

Company is ranked at 79% (point A).

At 79%, the company has moved back across the threshold of Mid-Cap core. It did not remain in the Mega-Cap core for two consecutive quarters, therefore the 50% packet that was moved to the Mega-Cap Index during the previous quarter is reallocated to Mid-Cap resulting in an 100% allocation to the Mid-Cap Index.

Example 3: Company moves from D in Q1 to C in Q2, to A in Q3, to B in Q4 and to C in Q5.

Q1 state:

Company is ranked at 63% (point D).

Since the company is located in the Mega-Cap core, it has a 100% allocation to that index.

Q2 state:

Company is ranked at 69% (point C).

The company moves into the band adjacent to the Mega-Cap core but, since it has not crossed the threshold to the adjacent index core, no movement occurs and the company maintains its 100% allocation to Mega-Cap Index.

Q3 state:

Company is ranked at 79% (point A).

The company has crossed the breakpoint and has moved beyond the band into the core of the Mid-Cap Index. Therefore, one 50% packet is moved out of Mega-Cap and into Mid-Cap. As a result, 50% of the company is allocated to Mega-Cap and 50% is allocated to Mid-Cap.

Q4 state:

Company is ranked at 71% (point B).

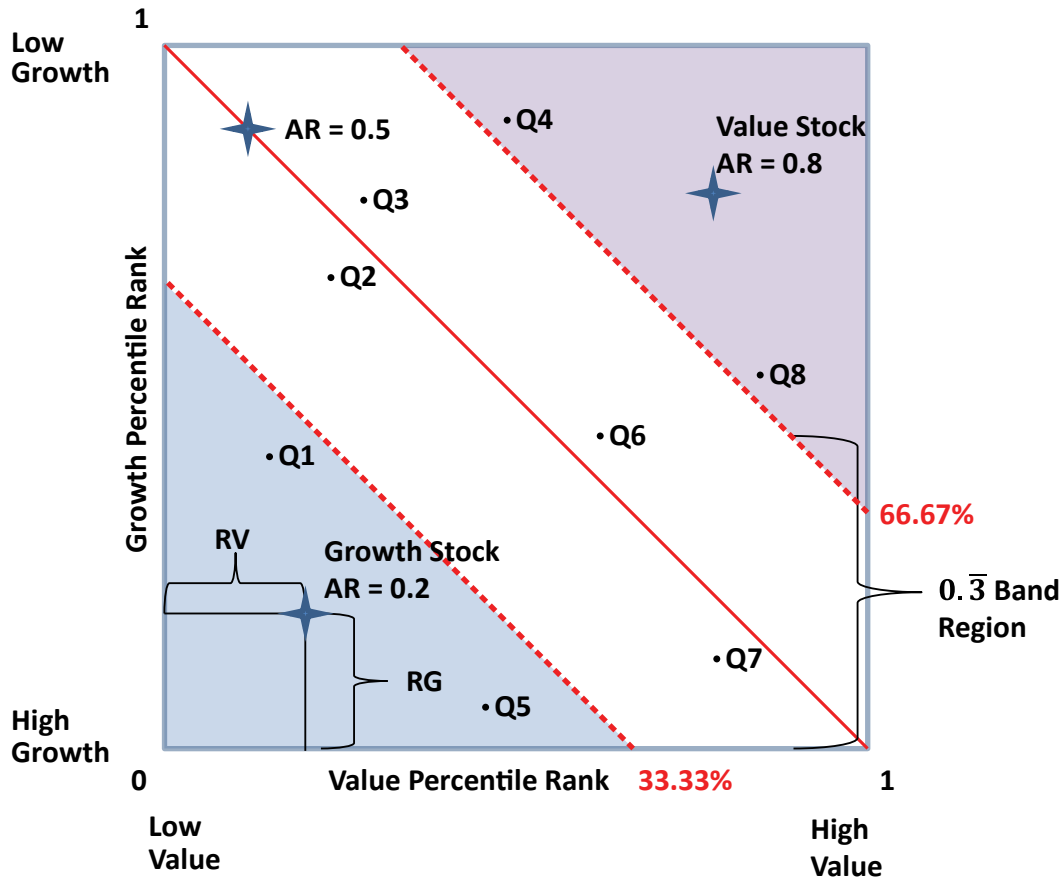
Because the company remains within the band, no movement occurs and the company's allocation remains split (50/50) between the Mid- and Mega-Cap indexes.

Q5 state:

Company is ranked at 69% (point C).

Though the company is now located on the Mega-Cap side of the band, since it has not moved beyond the band threshold, it will maintain the allocation from the previous quarter.

Value and Growth Style Migration Example



For the value and growth style indexes, CRSP set the breakpoint to 50% of AR and the band width to 33.33%. Therefore, the band range runs from an AR of 33.3% to an AR of 66.67%.

Q1 state:

Company's AR is 23% (point Q1).

Initially, the company's AR score is 23% and it is, therefore, allocated 100% to the growth index for its market segment.

Note: CRSP allocates a company first to the corresponding capitalization-based index. Then, based on its AR score, the security will be assigned to the corresponding value or growth index. Thus, the 100% allocation of growth index is corresponding to the total market capitalization that the company was allocated to this cap category. For example, when a company starts with half of its total market cap in CRSP's Mid Cap index (e.g., migrating between the Mid Cap index with an adjacent cap index), with an AR score of 23%, CRSP would allocate all of its available market cap in the Mid Cap index (i.e. 50% of its total market cap) to our Mid Growth index.

Q2 state:

Company's AR is 45% (point Q2) The company's AR score moves up to 45% but, since it is still within the band, it remains allocated 100% to the growth index.

Q3 state:

Company's AR is 55% (point Q3).

The company's AR score moves up again to 55%. Even though this value is above the 50% breakpoint, the company has not passed through the upper threshold of 66.67% so it will remain in growth.

Q4 state:

Company's AR is 68% (point Q4).

Now, the company's AR score is 68% which is greater than the upper threshold of 66.67%. CRSP will migrate one 50% packet to the value index within the company's market-cap segment, resulting in a 50% allocation to value and 50% allocation to growth.

Q5 state:

Company's AR is 30% (point Q5).

In this quarter, the company's AR score drops down to 30%. Since that number is below the lower threshold of 33.33%, CRSP will migrate the 50% packet moved to value in the previous quarter back to the company's original growth index. The company is once again allocated 100% to growth.

Q6 state:

Company's AR is 56% (point Q6).

The company's AR score rises to 56% but, since this is below the upper threshold, it remains 100% allocated to growth.

Q7 state:

Company's AR is 46% (point Q7).

The company's AR score decreases to 46% but, since this is above the lower threshold, it will remain 100% allocated to growth.

Q8 state:

Company's AR is 70% (point Q8).

In this quarter, the company's AR score finally moves enough to break through the upper threshold. Therefore, 50% will be allocated to growth and 50% to value.

Appendix B: Index Calculations

Index Level

Index Level is the value of an investment relative to its value at one fixed point in time. Index Levels allow convenient comparison of the relative performance of the different portfolios or asset classes. For CRSP U.S. Equity Indexes initial levels were set to 1,000. See Appendix E for a list of inception dates for all CRSP U.S. Equity Indexes.

Index Levels – Price Only

$$\text{Index Level}_t = \frac{\text{Index Market Value}_t}{\text{Divisor}_t}$$

Index Levels Including Dividends (Total Returns Index)

$$\text{Index Level TR}_t = \text{Index Level TR}_{t-1} \left(\frac{\text{Index Level}_t + \text{Dividend Points}_t}{\text{Index Level}_{t-1}} \right)$$

where

$$\text{Dividend Points}_t = \frac{\text{Dividend Amount}_t}{\text{Divisor}_t}$$

Divisor

$$\text{Divisor}_{\text{initial}} = \frac{\text{Index market value at inception}}{1,000}$$

$$\text{Divisor}_t = \text{Divisor}_{t-1} \left(\frac{\text{SOD Index Market Value}_t}{\text{EOD Index Market Value}_{t-1}} \right)$$

Index Returns

Index Returns – Price Only

$$\text{Index Return}_t = \left(\frac{\text{Index Level}_t}{\text{Index Level}_{t-1}} \right) - 1$$

Index Returns Including Dividends (Total Return)

$$\text{Index Return TR}_t = \left(\frac{\text{Index Level TR}_t}{\text{Index Level TR}_{t-1}} \right) - 1$$

Security Returns

The return on a security is equal to the change in the total value of the initial investment over a period of time divided by the amount of the initial investment. A total return takes into account all distributions to shareholders and reinvestments of cash dividends. Dividends are assumed to be reinvested at the end of the day on the ex-date. A price return, on the other hand, excludes ordinary cash dividends from the return calculation.

Security total returns are calculated according to the following equation:

$$r(t) = \left(\frac{p(t) + n(t) + d(t)}{p(t')} \right) - 1$$

Where:

$r(t)$ = return based on purchase at t' and sale at t

$p(t)$ = end-of-day price

$d(t)$ = dividend amount for t (Total Return only)

$n(t)$ = value of non-ordinary payments not available for start-of-day adjustment

$p(t')$ = start-of-day price on day t

Security Start-of-day Price

Start-of-day prices are derived by applying all known distribution values and split factors to the previous end-of-day price according to the formula below.

$$p(t') = \left(\frac{p(t-1)}{f(t)} \right) - v(t)$$

Where:

$p(t')$ = start-of-day price on day t

$p(t-1)$ = end-of-day price (closing) on previous trading day

$f(t)$ = split factor applicable on day t

$v(t)$ = value of non-ordinary (split adjusted) payments available for start-of-day adjustment (e.g. special dividends)

If a new security is created by a Merger, Conversion, or similar corporate action, its start-of-day price on the effective date of the corporate action is derived from the price of the securities that the investor held before the event. For each held security that was exchanged for the new security, the implied start-of-day price is calculated as:

New Security Implied Start-of-Day Price = (Held Security Start-of-Day Price – Any Cash Distributed) / Ratio of Shares of New Security per each share of Held Security

If more than one held security applies for the new security, the price is set using the result for the held security with the highest contributing capitalization, calculated as the total shares outstanding multiplied by the quantity of the start-of-day price minus any cash distributed.

Turnover

Turnover is a measurement of the overnight activity needed to maintain a weighted holdings match to an index, based on a fixed investment amount. The weight of a security is the ratio of the market value held to the total market value of the index. CRSP calculates daily index turnover number. Annual turnover is calculated as the summation of daily turnover:

$$\text{CRSP index daily turnover}_t = \frac{\sum_{i=1}^N |w_{i,t} - w_{i,t-1}|}{2}$$

where $w_{i,t}$ is the start of day weight for security i in the index and $w_{i,t-1}$ is the end of day weight for security i on day $t-1$. And N is the number of securities in the index.

Thus,

$$\text{CRSP index annual turnover} = \sum_{t=1}^T \text{CRSP Index Daily turnover}_t$$

where T is the total number of trading days in the calendar year.

Since there is no money inflow/outflow, for indexes, the total sales will always equal the total purchases. Thus, the total weight change due to sales will always equal to the total weight change due to purchases.

Additional Index Calculations

CRSP calculates additional daily index statistics which may be obtained upon request. A partial listing of additional statistics is provided below:

Daily Index Statistic	Description
Total return	The return on an index, including all distributions.
Capital appreciation return	The return on an index, excluding ordinary dividends.
Income return	The return on ordinary dividends in an index.
Total return index level	The value of an index, including all distributions, relative to its value at inception.
Income return index level	The total return index level minus the capital appreciation return index level.
Count of securities in the index	The total number of securities in an index with a valid price on the selected trading date.
End-of-day market value	In thousands of dollars. End-of-day total index capitalization of all index constituents.
Start-of-day market value	In thousands of dollars. Start-of-day total index capitalization of all index constituents.
Concentration ratio – one	Weight of the largest company in portfolio at start-of-day.
Concentration ratio – ten	Sum of the weights of the largest ten companies in portfolio at start-of-day.
Concentration ratio – large	Sum of the weights of the companies in portfolio with a weight over 5% at start-of-day.
Herfindahl-Hirschman Index	The sum of the squares of the market share percentages of all the individual components in an index computed using beginning of period market caps.
Aggregate Dollar Trading Volume	$\sum(\text{end of day price} \times \text{daily number of traded shares for all securities in an index})$

Price Adjustment Table

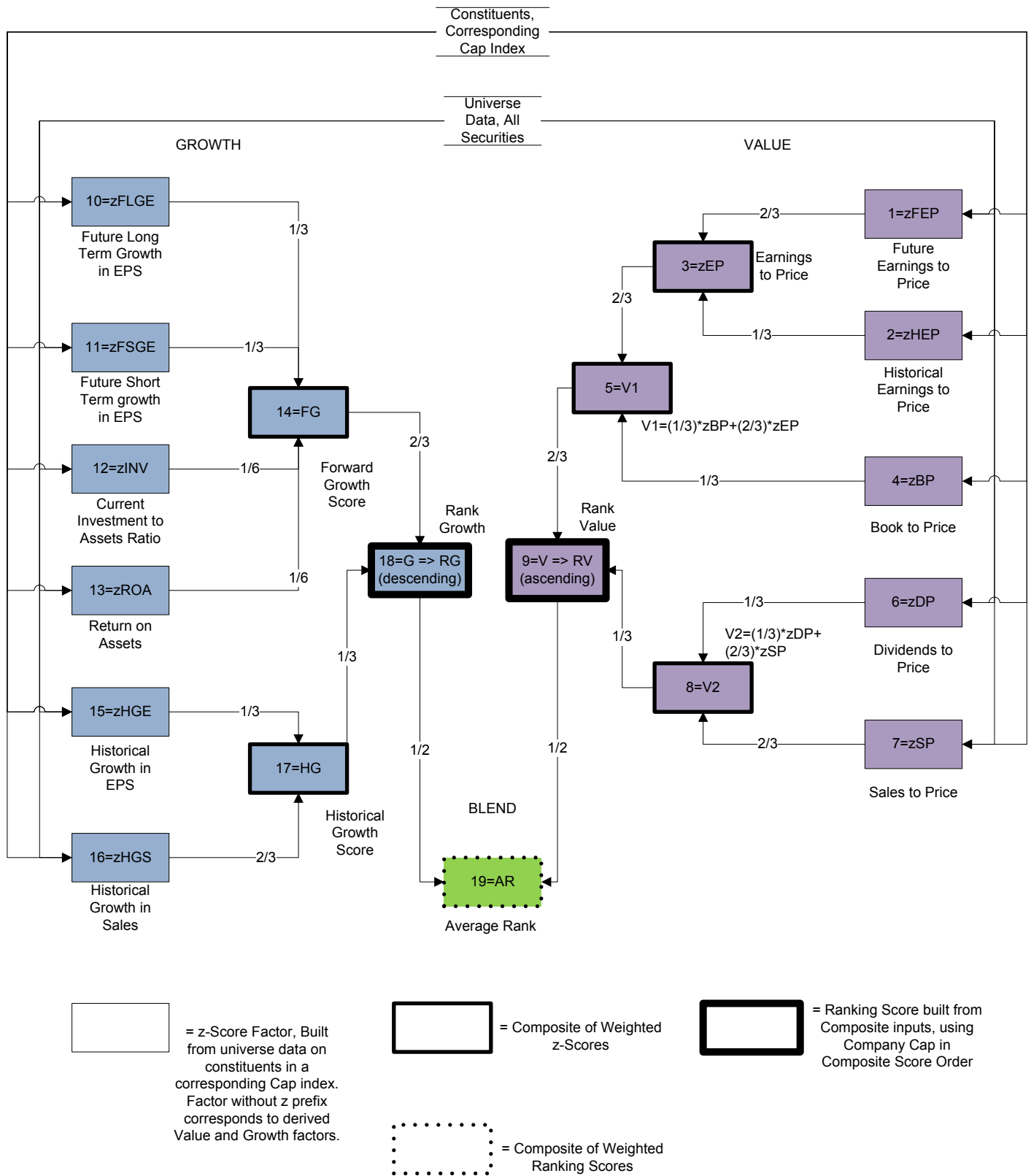
Action:	Description:	Price adjustment:
Special Dividend	A non-recurring distribution of a company assets, usually in the form of cash to shareholders.	Adjusted price = previous day closing price - special dividend cash amount.
Stock Dividend	A dividend payment made in the form of additional shares rather than a cash payout	Adjusted price = previous day closing price / (1+stock div ratio)
Stock Split	The increase in a company's number of outstanding shares of stock with an equally offsetting reduction in price. This event has no impact on the company's market capitalization.	Adjusted price = previous day closing price / split ratio
Reverse Stock split	The decrease in a company's number of outstanding shares of stock with an equal and offsetting increase in price. This event has no impact on the company's market capitalization.	Adjusted price = previous day closing price / split ratio
Spin-off (when-issued trading available before the ex-date)	The creation of an independent company through the sale or distribution of new shares of an existing business/division of a parent company. A spinoff is a type of divestiture.	Parent company's adjusted SOD price on the ex-date = parent company's closing price on the day before the ex-date – spun-off company's closing WI price on the day before the ex-date * spin-off ratio
Rights Offering	Rights issuance to the existing shareholders of a company allowing them to buy a number of additional shares at a given price (usually a discount) within a fixed period of time.	If the rights trade when-issued on the day before the ex-date, the price of the right on that day will be used to adjust the parent's price. If the rights do not trade and the rights are in-the-money, the fair market value formula is used to adjust the parent's price.
Stock Distribution	One security (A) distributes shares of another existing security (B).	Adjusted price (A) = previous day closing price (A) - closing price of (B) * distribution ratio

Appendix C: Value and Growth Factor Definitions and Calculations

Value Factors	Definition	Sources	Calculation	Data Considerations
BP	Book to Price	Compustat quarterly and annual, CRSP price and shares	$\text{Book Value} = \text{ATQ} - \text{LTQ} + \text{TXDITCQ} - \text{first available of (PSTK, PSTKRV, PSTKL)};$ replace negative result with 0. $\text{BP} = \text{Book Value} / \text{Company Cap}$	<p>Company Cap is the total capitalization of index eligible securities for the company.</p> <p>If no non-missing preferred stock value, then use 0 in calculation.</p> <p>If both ATQ and LTQ are unavailable at the last quarter, then use the latest quarter within the last four quarters where both are available. If no quarterly data in this range is available, then use the last annual AT and LT values.</p> <p>If still no data for both, then BP is missing.</p> <p>Use TXDITCQ or TXDITC at the corresponding filing used for ATQ and LTQ. If missing in that filing use a 0 in the calculation.</p>
FEP	Future Earnings per Price	IBES consensus, CRSP price	$\text{FEP} = (\text{weight}_{1Y} * \text{EPS_EST}_{1Y} + \text{weight}_{2Y} * \text{EPS_EST}_{2Y}) / \text{price},$ where weight_{1Y} = # of months, rounded up between current date and next annual reporting period, (minimum of 1) / 12, and $\text{weight}_{2Y} = 1 - \text{weight}_{1Y}$.	<p>If only one of the estimates is available fully weight the other one. Calculated for primary security according to IBES, inherited by other securities of the same company.</p> <p>Earnings per Share values are split adjusted between report date and current date using CRSP adjustment data.</p>
HEP	Historical Earnings per Price	IBES actual, CRSP price	$\text{HEP} = \text{sum of last 4 EPS_ACT_QTR} / \text{price}$	<p>Calculated for primary security according to IBES, inherited by other securities of the same company.</p> <p>Earnings per Share values are split adjusted between report date and current date using CRSP adjustment data.</p>
DP	Dividends to Price	Compustat, CRSP price and shares	$\text{DP} = \text{DVC} / \text{Company Cap}$	Same Company Cap as BP.
SP	Sales to Price	Compustat Quarterly, CRSP price and shares	$\text{SP} = \text{sum of last 4 SALEQ} / \text{Company Cap}$	Same Company Cap as BP. Pro-rate as in HEP.

Growth Factors	Definition	Sources	Calculation	Data Considerations
FLGE	Future Long Term Growth in EPS	IBES consensus	$FLGE = EPS_EST_LTG$	No restrictions based on number of estimates. Calculated for primary security according to IBES, inherited by other securities of the same company.
FSGE	Future Short Term Growth in EPS	IBES consensus and Actual	$FSGE = (weight_1Y * EPS_EST_1Y + weight_2Y * EPS_EST_2Y) - \text{sum of last 4 } EPS_ACT_QTR / \text{abs}(\text{sum of last 4 } EPS_ACT_QTR)$	Inputs and rules are similar to FEP and HEP, but without price, which is the same and cancels out. Calculated for primary security according to IBES, inherited by other securities of the same company. Missing if sum of EPS_ACT_QTR last 4 quarters is ≤ 0 or calculated 1 year estimate is negative. Earnings per Share values are split adjusted between report date and current date using CRSP adjustment data.
HGE	Historical Growth in EPS	IBES Actual	$HGE = (\text{sum of last four } EPS_ACT_QTR - \text{sum of } EPS_ACT_QTR \text{ 12-15 quarters ago}) / \text{abs}(\text{sum of } EPS_ACT_QTR \text{ 12-15 quarters ago})$	Pro rate sums separately for quarters 0-3 and 12-15 if not all quarters are available. Missing if sum 12-15 quarters ago is ≤ 0 or sum 0-3 quarters ago is negative. If pro rating base period then pro rate final period using the quarters corresponding to the available base quarters. Earnings per Share values are split adjusted between report date and current date using CRSP adjustment data.
HGS	Historical Growth in Sales	Compustat	$HGS = (\text{sum of last four } SALEQ - \text{sum of } SALEQ \text{ 12-15 quarters ago}) / \text{abs}(\text{sum of } SALEQ \text{ 12-15 quarters ago})$	Pro rate sums separately for quarters 0-3 and 12-15 if not all quarters are available. Missing if sum of $SALEQ$ 12-15 quarters ago is ≤ 0 or sum of $SALEQ$ 0-3 quarters ago is negative. If pro rating base period then pro rate final period using the quarters corresponding to the available base quarters. $SALEQ$ earlier than the most recent quarter can be used even if non-primary as long as the most recent quarter is primary.
INV	Current Investment to Assets Ratio	Compustat	$INV = (PPEGTQ - PPEGTQ \text{ 4 quarters earlier} + INVTQ - INVTQ \text{ 4 quarters earlier}) / ATQ \text{ 4 quarters earlier}$	If $INVTQ$ is unavailable for the last quarter, then use the latest quarter within the last four quarters where it is found. If still no quarterly data in this range, then use the last annual $INVT$ value. If both $INVTQ$ and ATQ are unavailable five quarters ago, then use the last quarterly filing five to eight quarters ago where both are found. If both are still not found, use $INVT$ and AT from the second to last annual filing. Use the $PPEGTQ$ or $PPEGT$ value corresponding to the quarterly or annual filing used to represent latest $INVTQ$ or four quarters earlier $INVTQ$ and ATQ . If $PPEGTQ$ is not available in either, use a 0 in the calculation for both. If only one is available, then report INV as missing.
ROA	Return on Assets	Compustat	$ROA = \text{Sum of last 4 } IBQ / ATQ \text{ 4 quarters earlier}$	Pro-rate IBQ quarters as in HEP. If ATQ is missing five quarters ago then use the last annual AT .

Appendix D: Value and Growth Factors Diagram



Appendix E: CRSP U.S. Equity Indexes Quick Reference Summary

Index Description	Index Name	Index Identifier	CUSIP	NASDAQ GIDS Post Date	Inception Date Open Val = 1000	Bloomberg Ticker
Total Market Index	CRSP U.S. Total Market Index (TR)	CRSPTMT	12628H109	12/31/2012	4/1/2011	BBG003PZ7F43
	CRSP U.S. Total Market Index (PR)	CRSPTM1	12628G101	1/18/2011	4/1/2011	BBG001DQ7123
CRSP Australian Hedged Index	CRSP US Total Market Index (AUD-hedged) (TR)	CRSPTAHT	12633D200	7/1/2015	–	BBG009J9GN20
	CRSP US Total Market Index (AUD-hedged) (PR)	CRSPTAH1	12633D101	7/1/2015	–	BBG009J9GN11
CRSP Australian Non-Hedged Index	CRSP US Total Market Total Return Index AUD (TR)	CRSPTMAT	12633D408	7/1/2015	–	BBG009J9GN48
	CRSP US Total Market Total Return Index AUD (PR)	CRSPTMA1	12633D309	7/1/2015	–	BBG009J9GN39
CRSP Canadian Hedged Index	CRSP U.S. Total Market Index (CAD-hedged) (TR)	CRSPTCHT	12630Y108	12/31/2012	–	BBG003PZ7F52
	CRSP U.S. Total Market Index (CAD-hedged) (PR)	CRSPTCH1	12628G200	12/31/2012	–	BBG003PZ7F34
CRSP Canadian Non-Hedged Index	CRSP U.S. Total Market Total Return Index CAD (TR)	CRSPTMCT	12632P204	4/15/2013	–	BBG004MF5W1
	CRSP U.S. Total Market Index CAD (PR)	CRSPTMC1	12632M201	4/15/2013	–	BBG004MF5V2
Mega Cap	CRSP U.S. Mega Cap Index (TR)	CRSPMET	12627R108	12/31/2012	4/1/2011	BBG003PZ7F61
	CRSP U.S. Mega Cap Index (PR)	CRSPME1	12627R108	8/15/2011	4/1/2011	BBG001YCYN69
Mega Cap Growth	CRSP U.S. Mega Cap Growth Index (TR)	CRSPMEGT	12630R103	12/31/2012	9/10/2012	BBG003PZ7F70
	CRSP U.S. Mega Cap Growth Index (PR)	CRSPMEG1	12630R103	10/1/2012	9/10/2012	BBG003PZ7DH4
Mega Cap Value	CRSP U.S. Mega Cap Value Index (TR)	CRSPMEVT	12630T109	12/31/2012	9/10/2012	BBG003PZ7F89
	CRSP U.S. Mega Cap Value Index (PR)	CRSPMEV1	12630T109	10/1/2012	9/10/2012	BBG003PZ7DJ2
Mega + Mid Cap	CRSP U.S. Large Cap Index (TR)	CRSPLCT	12631M103	12/31/2012	4/1/2011	BBG003PZ7F98
	CRSP U.S. Large Cap Index (PR)	CRSPLC1	12627P102	8/15/2011	4/1/2011	BBG001YCYN50
Mega + Mid Cap Growth	CRSP U.S. Large Cap Growth Index (TR)	CRSPLCGT	12630W102	12/31/2012	9/10/2012	BBG003PZ7FB5
	CRSP U.S. Large Cap Growth Index (PR)	CRSPLCG1	12630W102	10/1/2012	9/10/2012	BBG003PZ7DK0
Mega + Mid Cap Value	CRSP U.S. Large Cap Value Index (TR)	CRSPLCVT	12630X100	12/31/2012	9/10/2012	BBG003PZ7FC4
	CRSP U.S. Large Cap Value Index (PR)	CRSPLCV1	12630X100	10/1/2012	9/10/2012	BBG003PZ7DL9
Mid Cap	CRSP U.S. Mid Cap Index (TR)	CRSPMIT	12631T108	12/31/2012	4/1/2011	BBG003PZ7FD3
	CRSP U.S. Mid Cap Index (PR)	CRSPMI1	12627W107	8/15/2011	4/1/2011	BBG001YCYN87
Mid Cap Growth	CRSP U.S. Mid Cap Growth Index (TR)	CRSPMIGT	12628N106	12/31/2012	9/10/2012	BBG003PZ7FF1
	CRSP U.S. Mid Cap Growth Index (PR)	CRSPMIG1	12631A109	10/1/2012	9/10/2012	BBG003PZ7DM8
Mid Cap Value	CRSP U.S. Mid Cap Value Index (TR)	CRSPMIVT	12629L109	12/31/2012	9/10/2012	BBG003PZ7FG0
	CRSP U.S. Mid Cap Value Index (PR)	CRSPMIV1	12631C105	10/1/2012	9/10/2012	BBG003PZ7DN7
Small Cap	CRSP U.S. Small Cap Index (TR)	CRSPSCT	12630N102	12/31/2012	4/1/2011	BBG003PZ7FH9
	CRSP U.S. Small Cap Index (PR)	CRSPSC1	12628A104	8/15/2011	4/1/2011	BBG001YCYNB3
Small Cap Growth	CRSP U.S. Small Cap Growth Index (TR)	CRSPSCGT	12630V104	12/31/2012	9/10/2012	BBG003PZ7FJ7
	CRSP U.S. Small Cap Growth Index (PR)	CRSPSCG1	12631E101	10/1/2012	9/10/2012	BBG003PZ7DP5
Small Cap Value	CRSP U.S. Small Cap Value Index (TR)	CRSPSCVT	12631N101	12/31/2012	9/10/2012	BBG003PZ7FK5
	CRSP U.S. Small Cap Value Index (PR)	CRSPSCV1	12631F108	10/1/2012	9/10/2012	BBG003PZ7DQ4
Small + Mid Cap	CRSP U.S. Small / Mid Cap Index (TR)	CRSPSMT	12591C103	3/10/2014	3/31/2011*	BBG0069LWSJ3
	CRSP U.S. Small / Mid Cap Index (PR)	CRSPSM1	12632T107	3/10/2014	3/31/2011*	BBG0069LWSH5
Small + Mid Cap Growth	CRSP U.S. Small / Mid Cap Growth Index (TR)	CRSPSMGT	12591P104	3/10/2014	9/10/2012*	BBG0069LWSF7
	CRSP U.S. Small / Mid Cap Growth Index (PR)	CRSPSMG1	12591M101	3/10/2014	9/10/2012*	BBG0069LWSC0
Small + Mid Cap Value	CRSP U.S. Small / Mid Cap Value Index (TR)	CRSPMVT	12591L103	3/10/2014	9/10/2012*	BBG0069LWSG6
	CRSP U.S. Small / Mid Cap Value Index (PR)	CRSPMV1	12591E109	3/10/2014	9/10/2012*	BBG0069LWSD9
Micro Cap Index	CRSP U.S. Micro Cap Index (TR)	CRSPMCT	12631V103	12/31/2012	4/1/2011	BBG003PZ7FL4
	CRSP U.S. Micro Cap Index (PR)	CRSPMC1	12627T104	8/15/2011	4/1/2011	BBG001YCYN78

Index Description	Index Name	Index Identifier	CUSIP	NASDAQ GIDS Post Date	Inception Date Open Val = 1000	Bloomberg Ticker
Consumer Goods	CRSP U.S. Consumer Goods Index (TR)	CRSPCGT	12631W101	12/31/2012	2/1/2012	BBG003PZ7FM3
	CRSP U.S. Consumer Goods Index (PR)	CRSPCG1	12630G107	7/16/2012	2/1/2012	BBG003PZ7DR3
Consumer Services	CRSP U.S. Consumer Services Index (TR)	CRSPCST	12631X109	12/31/2012	2/1/2012	BBG003PZ7FN2
	CRSP U.S. Consumer Services Index (PR)	CRSPCS1	12630J101	7/16/2012	2/1/2012	BBG003PZ7DS2
Oil and Gas	CRSP U.S. Oil and Gas Index (TR)	CRSPENT	12631Y107	12/31/2012	2/1/2012	BBG003PZ7FP0
	CRSP U.S. Oil and Gas Index (PR)	CRSPEN1	12630A100	7/16/2012	2/1/2012	BBG003PZ7DT1
Financials	CRSP U.S. Financials Index (TR)	CSPFNT	12632A108	12/31/2012	2/1/2012	BBG003PZ7FQ9
	CRSP U.S. Financials Index (PR)	CRSPFN1	12630M104	7/16/2012	2/1/2012	BBG003PZ7DV8
Health Care	CRSP U.S. Health Care Index (TR)	CRSPHCT	12632C104	12/31/2012	2/1/2012	BBG003PZ7FR8
	CRSP U.S. Health Care Index (PR)	CRSPHC1	12630H105	7/16/2012	2/1/2012	BBG003PZ7DW7
Industrials	CRSP U.S. Industrials Index (TR)	CRSPIDT	12632E100	12/31/2012	2/1/2012	BBG003PZ7FS7
	CRSP U.S. Industrials Index (PR)	CRSPID1	12630F109	7/16/2012	2/1/2012	BBG003PZ7DX6
Technology	CRSP U.S. Technology Index (TR)	CRSPITT	12632F107	12/31/2012	2/1/2012	BBG003PZ7FT6
	CRSP U.S. Technology Index (PR)	CRSPIT1	12630P107	7/16/2012	2/1/2012	BBG003PZ7DY5
Materials	CRSP U.S. Materials Index (TR)	CRSPMTT	12632G105	12/31/2012	2/1/2012	BBG003PZ7FV3
	CRSP U.S. Materials Index (PR)	CRSPMT1	12630E102	7/16/2012	2/1/2012	BBG003PZ7DZ4
Telecommunications	CRSP U.S. Telecom Index (TR)	CRSPTET	12632H103	12/31/2012	2/1/2012	BBG003PZ7FW2
	CRSP U.S. Telecom Index (PR)	CRSPTE1	12630K108	7/16/2012	2/1/2012	BBG003PZ7F07
Utilities	CRSP U.S. Utilities Index (TR)	CRSPUTT	12632J109	12/31/2012	2/1/2012	BBG003PZ7FX1
	CRSP U.S. Utilities Index (PR)	CRSPUT1	12630L106	7/16/2012	2/1/2012	BBG003PZ7F16
REIT Index	CRSP U.S. REIT Index (TR)	CRSPRET	12632K106	12/31/2012	4/1/2011	BBG003PZ7FY0
	CRSP U.S. REIT Index (PR)	CRSPRE1	12627X105	8/15/2011	4/1/2011	BBG001YCYN96
Small Cap ex-REITs	CRSP U.S. Small Cap ex-REIT Index (TR)	CRSPSXT	12631G106	12/31/2012	2/1/2012	BBG003PZ7FZ9
	CRSP U.S. Small Cap ex-REIT Index (PR)	CRSPSX1	12631G106	10/1/2012	9/10/2012	BBG003PZ7F25

**Small + Mid indexes are initialized on 2/7/2014 based on the composite history of their underlying Small and Mid indexes since their inception.*

Appendix F: American Territories, Domiciles of Convenience, and Tax Havens

ISO Code	U.S. Territories
AS	American Samoa
GU	Guam
MH	Marshall Islands
MP	Northern Mariana Islands
PW	Palau
PR	Puerto Rico
VI	US Virgin Islands

ISO Code	Domiciles of Convenience
AW	Aruba
AI	Anguilla
AN	Netherlands Antilles
AG	Antigua
BS	Bahamas
BM	Bermuda
BB	Barbados
KY	Cayman Islands
DM	Dominica
DO	Dominican Republic
GG	Guernsey
GI	Gibraltar
HT	Haiti
IM	Isle of Man
JM	Jamaica
JE	Jersey
KN	St. Kitts and Nevis
LR	Liberia
LC	St. Lucia
LU	Luxembourg
MF	St. Martin
MS	Montserrat
PA	Panama
TC	Turks and Caicos Islands
TT	Trinidad and Tobago
VC	St. Vincent and the Grenadines
VG	British Virgin Islands

ISO Code	Tax Havens
CH	Switzerland
IE	Ireland
NL	Netherlands

Appendix G: Hours, Holidays, and Early Closures

Hours:

The CRSP Index Operations department is open from 7:00 a.m. to 6:00 p.m. CST.

Holidays:

CRSP observes the following holidays:

	2017	2018
New Year's Day	January 2	January 1
Martin Luther King, Jr. Day	January 16	January 15
President's Day	February 20	February 19
Good Friday	April 14	March 30
Memorial Day	May 29	May 28
Independence Day*	July 4	July 4
Labor Day	September 4	September 3
Thanksgiving Day+	November 23	November 22
Christmas	December 25	December 25

*CRSP Index Operations will close at 1 p.m. EST the day prior to these holidays.

+CRSP Index Operations will close at 1 p.m. EST the day after this holiday.

Early Closures:

CRSP will close early on the days stated above, in accordance with early equity market closes. On days of early close, CRSP's final release will be completed at 10:30 a.m. CST.

Appendix H: Summary of Methodology Refinements and Transitional Reconstitution Calendar

CRSP will implement the following methodology refinements after the close Friday, March 17, 2017. Detailed information may be found within the December 2016 CRSP U.S. Equity Indexes Methodology Guide on the pages indicated.

[Additional Investability Screen for Suspended Securities – page 5](#)

Exchange trading suspensions are treated as an additional investability screen.

If a security has been suspended from its primary listing exchange for at least 40 trading days at ranking, it fails this investability test and will be removed from the CRSP U.S. Indexes on the Reconstitution Day, (or the “Final Transition Day” beginning with the September 2017 ranking).

[Fast Track IPOs – page 16](#)

CRSP is moving the fast-track inclusion capitalization threshold from 85% (Mid Cap breakpoint) to 98% (Small Cap breakpoint) (as of the December 2016 ranking Mid Cap breakpoint = \$6.34B, Small Cap breakpoint = \$888M).

[Constrained Sector Indexes – page 27](#)

For methodology refinements related to constrained sector indexes, see [page 25](#) of the CRSP U.S. Equity Indexes Methodology Guide.

[IPOs in Value and Growth Style Indexes – page 33](#)

If a security's size is lower than the Large Cap lower breakpoint (85%), or a style cannot be assigned for an added security, it will be set to 50% in Value and 50% in Growth in corresponding style indexes for each size index it is added to. As soon as a value/growth style score can be calculated at a ranking, the security will move to the appropriate value or growth index.

[In-the-Money and Out-of-the-Money Rights – page 17](#)

A right or warrant is added to the distributing security on the ex-date. While only the distributing security is reported as a constituent, the combined start-of-day capitalization of the security and its distributed right or warrant is reported.

At the end of the ex-date, the right or warrant is valued separately and is added as a payment value (end-of-day price adjustment) to the distributing security. The payment amount used is the higher of either the intrinsic value or the trading value of the right or warrant at the end of the ex-date.

If the right is in-the-money, based on the last price before the ex-date, then the shares of the distributing security are increased after the close of the ex-date as if all exercisable rights are exercised. If the distributing security is in the index (index constituent), its index holdings are trued-up based on its new total shares outstanding and float.

[Warrant Distributions – page 18](#)

Warrant distributions are treated in the same manner as rights distributions. However, received warrants are generally assumed to be sold rather than exercised. In other words, as opposed to in-the-money rights distributions, index holdings are not increased effective after the close of the ex-date.

[Dutch Tender Offers \(Shares Repurchase\) – page 22](#)

Changes in a security's float resulting from Dutch auctions that represent 5% or more of the security's holdings in the U.S. Total Market Index will generally be implemented on one of the five trading days following the tender offer results announcement*.

If insufficient notice is provided and/or information is not available, the event will be implemented at the next regularly scheduled ranking or upon the application of a non-cap neutral intra-quarter corporate action.

Changes in a security's float resulting from Dutch auctions that represent less than 5% of the security's holdings in the U.S. Total Market Index will be implemented at the next quarterly ranking or upon the application of a non-cap neutral intra-quarter corporate action.

CRSP will implement Transitional Reconstitution with the September 2017 Ranking:

[Buffering Rebalance Changes: Transitional Reconstitution page 10](#)

As an evolution of CRSP’s methodology, CRSP has extended the rebalance period from a one-day reconstitution to a five-day transition.

If a corporate action (e.g. secondary offering) occurs during the transition phase, holdings will be trued up with all remaining incremental packets moved to their final index location.

See [page 11](#) of the methodology guide regarding changes in the treatment of reverse mergers during the transition period.

Transitional Reconstitution Calendar September 2017

Transitional Reconstitution Calendar – September 2017				
Monday	Tuesday	Wednesday	Thursday	Friday
				September 1
				TD-8 “Ranking Day” after the close
September 4	September 5	September 6	September 7	September 8
Labor Day	TD-6 <u>Pro Forma Day 1</u>	TD-5 <u>Pro Forma Day 2</u>	TD-4 <u>Pro Forma Day 3</u>	TD-3 <u>Pro Forma Day 4</u>
September 11	September 12	September 13	September 14	September 15
TD-2 Pro Forma Day 5	TD-1 Pro Forma Day 6	TD1 Transition Day 1	TD2 Transition Day 2	TD3 Transition Day 3
September 18	September 19	September 20	September 21	September 22
TD4 Transition Day 4	TD5 Transition Day 5 “Final Transition Day” after the close	TD+1	TD+2	TD+3

KEY
Days are labeled on an After Close basis
TD'±x': Denotes trading day relative to Transition Window.
TD5: Last trading day of the Transition Window, known as “Transition Day 5” and also “Final Transition Day.”
<u>Pro Forma Adjustment Period</u>
Pro Forma Period
Pro Forma and Transition Period

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CRSP Contact Information

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