

## Chittagong Stock Exchange

### Index Methodology

Index is a statistical measure of change in an economy or a securities market. A stock index or stock market index is a measurement of the value of a section of the stock market. It is computed from the prices of selected stocks (typically a weighted average). It is a tool used by investors and investment analysts to describe the market, and to compare the return on specific investments. A stock market index is a number that indicates the relative level of prices or value of securities in a market on a particular day compared with a base-day figure, which is usually 100 or 1000.

There are many different ways of constructing an index. One of the most common methods is illustrated by the following simple example:

The values of a market portfolio at the close of trading on Day 1 and Day 2 are recorded below:

	Value of portfolio	Index
DAY	1	
(base day)	Tk. 20,000	1000
Day 2	Tk. 30,000	1500

We take Day 1 as the base day. The index on that day will be taken as a standard. The value assigned to the base day index is 1000 in this example. On Day 2, the value of the portfolio has changed from Tk. 20,000 to Tk. 30,000, a 50% increase. Therefore, the value of the index on Day 2 will change to indicate a corresponding 50% increase in market value. The computation follows the procedure below:

$$\begin{aligned} \text{Day 2's index} &= \frac{\text{Day 2's portfolio value}}{\text{Base Day's portfolio value}} \quad * \text{Base Day's index} \\ &= \frac{\text{Tk. 30,000}}{\text{Tk. 20,000}} \quad * 1000 \\ &= 1500 \end{aligned}$$

Day 2's index is 1500 as compared to the 1000 of day 1.

The above illustration only serves as an introduction to how a particular index is constructed. The daily computation of an index is more involved especially when there are changes in market capitalization of constituent stocks, e.g., rights offers, stock dividend etc.

The primary objective of constructing market indices is to measure the performance of the market. The indices provide vital information about the current and historical behavior of the market.

At present, Chittagong Stock Exchange Limited (CSE) is managing several indices which are listed below:

- CSE All Share Price Index (CASPI)
- CSE Selective Categories Index (CSCX)
- CSE30 Index
- CSE50 (Benchmark Index)
- CSE Shariah Index (CSI) and
- Sector Wise Indices:
  - GENERAL INSURANCE
  - TEXTILES & CLOTHING
  - PHARMA & CHEMICALS
  - FOODS & ALLIED
  - CEMENT
  - ENG. & ELECTRICAL
  - LEATHER & FOOTWEAR
  - SERVICES & PROPERTY
  - PAPERS & PRINTING
  - ENERGY
  - MUTUAL FUNDS
  - BANK
  - CERAMIC
  - ICT
  - LEASING & FINANCE
  - LIFE INSURANCE
  - TELECOMMUNICATION
  - MISCELLANEOUS

All the indices of the CSE are calculated and maintained following Laspeyres Method which was considered as the most transparent and scientific at the time of its inception. To adopt a modern and internationally accepted calculation methodology to provide a more sensitive, investable, tradable and transparently managed Index; CSE has been following Free Float Methodology of index construction since the year 2013. The constituents are free float adjusted with only the investable portion included in the index calculation.

Globally, the Free-Float Methodology of index construction is considered to be an industry best practice and all major indexes like MSCI, FTSE and S&P have adopted the same. MSCI, a leading global index, shifted all its indices to the Free-float Methodology in 2002.

Free-float Methodology refers to an index construction methodology that takes into consideration only the free-float market capitalization of a company for the purpose of index calculation and assigning weight to stocks in the Index. Free-float market capitalization takes into consideration only those shares issued by the company that are readily available for trading at the Stock Exchange.

It generally excludes promoters' holding, government holding, strategic holding and other locked-in shares that will not come to the market for trading in the normal course.

**Free-Float Calculation Methodology:**

Total Outstanding Securities	XXX	
Less: Securities held by Sponsors/Directors		XXX
Securities held by Government		XXX
Strategic stakes by private corporate bodies/individuals (any holding more than 5% held by an individual/company be considered as strategic)		XXX
Securities held by Associate Companies (Cross holdings)		XXX
Any other locked-in securities		<u>XXX</u>
Total Free-Float Securities	<u>XXX</u>	

**Eligibility Criteria for inclusion to the Free – float Index:**

Securities must be sufficiently liquid to be traded. Securities which do not have any trade during review period (6 Months) will not be eligible for inclusion in the indices until the next semi-annual review.

A security that is excluded because it fails the liquidity requirement will be excluded from all indices for the period until the next semi-annual review.

In exceptional market conditions, if trading volumes are very low, the CSE Index Committee may relax the selection criteria in terms of liquidity in order to avoid a large number of constituents being removed from the CSE Index. This discretion may not be applied to individual securities.

**Security type:**

- Only the companies listed with CSE are eligible to be included in the index.
- Inactive stocks not being traded for consecutive six months are not considered for selection.
- Mutual Funds and Debt securities are not considered for selection in index (there is a separate index for Mutual Fund Sector).
- Convertible preference shares and convertible debts are excluded from selection in index until conversion.
- Warrants and stock options are excluded from selection in index.
- A newly listed scrip is included in the index after first day trading.

- Only Regular trades (other than bulk or foreign etc.), are considered in calculating index.
- No changes either in number of shares or index divisor is allowed during trading session.
- CSE Index committee reviews the index – its criteria, performance and calculation method after every six months.

**Size and Floatation:**

The security must have 5% free – float shares and trading volume during 6 months review period.

The indices values are disseminated on line to all the Global Work Stations (GWS) during trading sessions and after every three minutes the index values will be refreshed.

***CSE ALL SHARE PRICE INDEX (CASPI)***

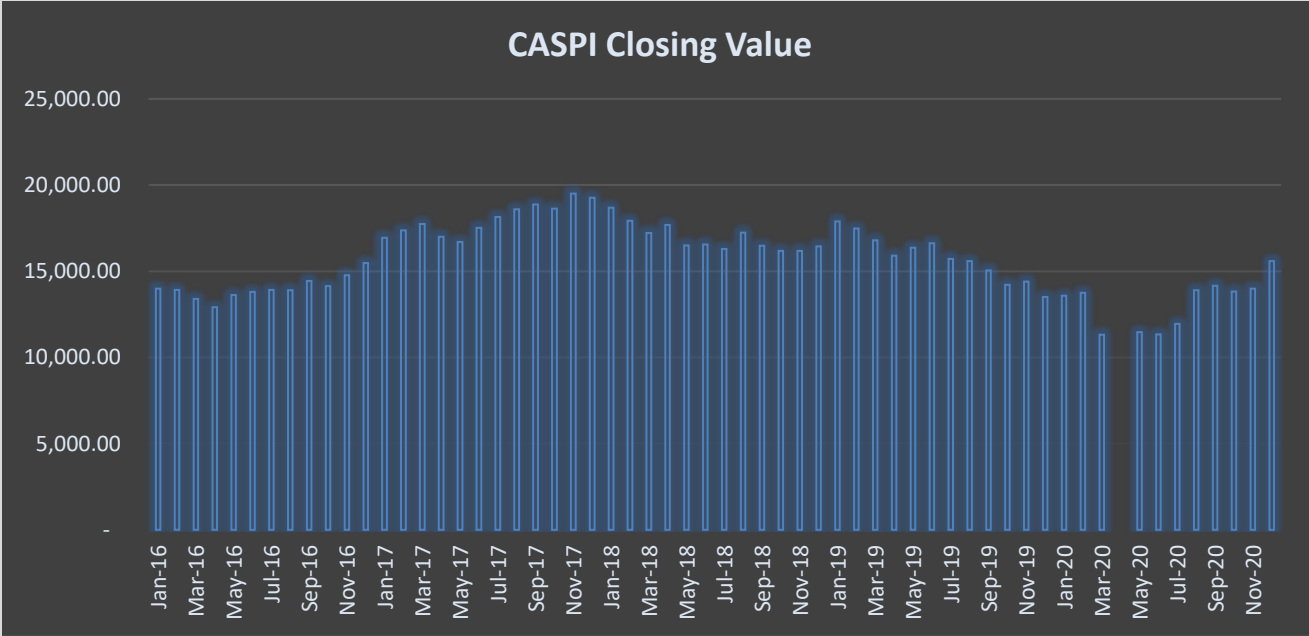
A good market representative index should involve:

- Scientific calculation formulas with clear adjustment procedure
- Logical scrip selection criteria
- Distinct base date
- Meaningful base value

The only index the CSE has been maintaining since 10<sup>th</sup> October 1995 is “CSE ALL SHARE PRICE INDEX (CASPI)” using Chained Paasche method. It faces question of clarity. This index was subject to unusual ups and downs and without a distinct base value. Therefore, in need of a clean slate CSE finds the date 1 January 2000 was the best date to start new Indices.

**CSE All Share Price Index with new formula and base date 30<sup>th</sup> December 1999 (the last day of the year) and new base index of thousand (to mark the millennium) replaced the existing one.**

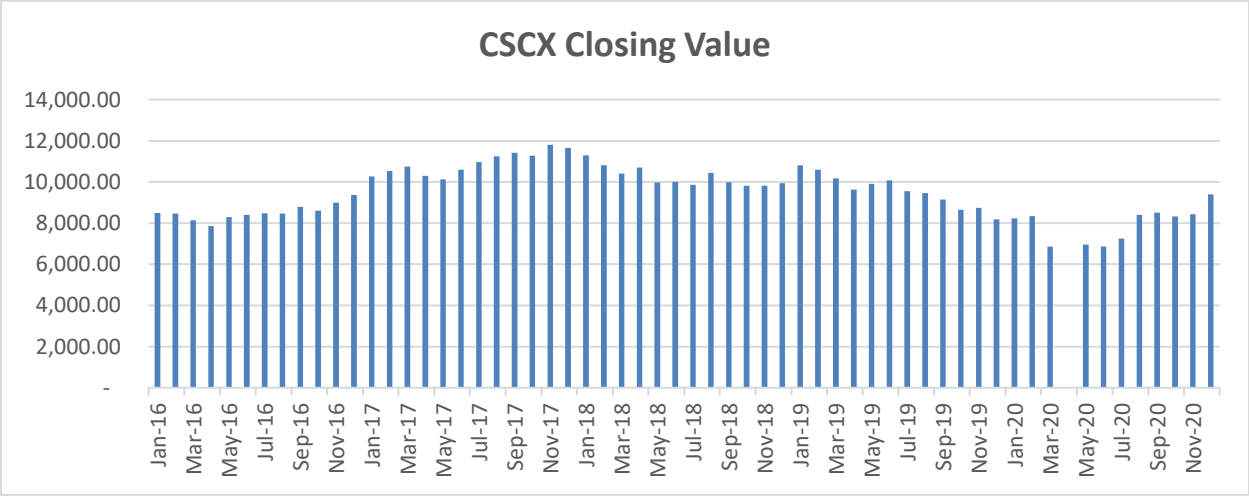
We have studied index of a number of bourses and found that the Laspeyres Method to calculate index is regarded as the most transparent and scientific method.



**CSE Selective Categories Index - CSCX**

CSE launched a new index named CSCX (CSE Selective Categories' Index) comprised A, B, G & N category companies from 14th February 2004 to replace the earlier CSE Trade Volume Weighted Index. The Base Date of this index is 15th April 2001 (when A, B & Z category were introduced) and Base Value is set to 1000.

The new index includes all but not the Z category companies. This also excludes the companies/scrips which are debt securities, mutual funds, suspended for indefinite period and non-traded for preceding six months of review meeting. The index is reviewed in the Index Committee Meeting after every six months like other indices of CSE.



### **CSE30 Index:**

CSE launched a completely new Selective Index incorporating 30 scrips with base date 30<sup>th</sup> December 1999 and base index 1000.

After revision in the Index Advisory Committee Meeting held on 4<sup>th</sup> Sep 2018, *two-layer methods are followed for selection of listed companies in the CSE30 Index. In the first layer method, basic criteria are considered for primary selection.*

### **BASIC CRITERIA**

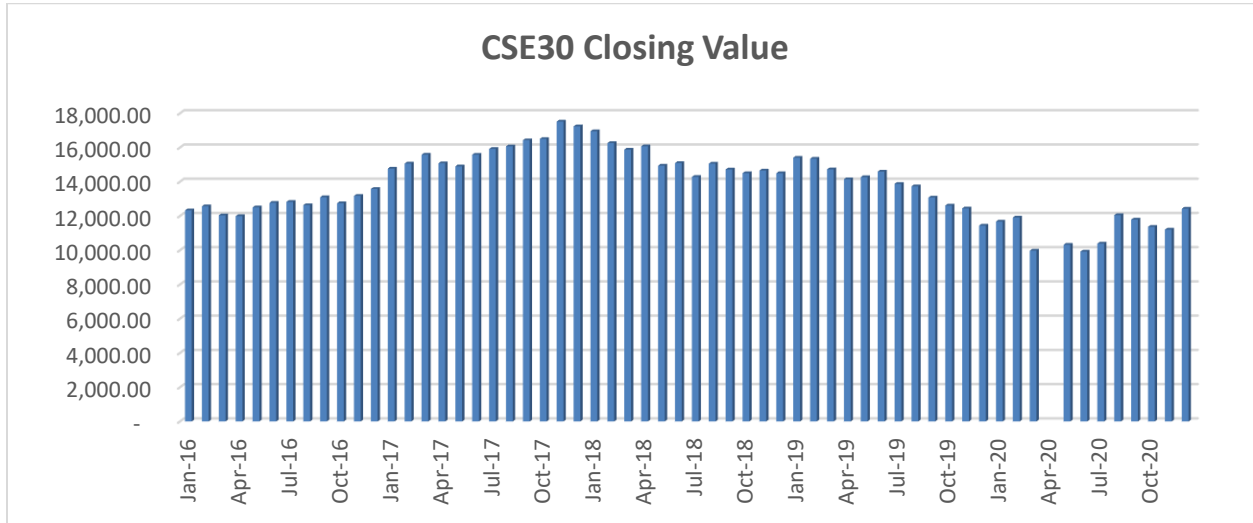
1. Must be listed with the Chittagong Stock Exchange Limited.
2. In case of IPO/New Issue, this should be on listing either with DSE or CSE for a minimum period of 2 years or remained in Commercial Production in Bangladesh for the minimum Five years prior to its listing.
3. Companies that did not hold their Annual General Meetings regularly will not be considered.
4. Minimum market capitalization must be Tk. 600 million.
5. Must have at least 20% free floating share capital. Free floating share capital shall mean the share capital which will exclude Govt's holding (other than ICB), Sponsors/Directors & their Associates' holding plus other locked-in portions.
6. Must have positive revenue reserve/ retained earnings.
7. Must be traded for at least 70% trading days of the six-monthly review period.
8. Declared dividend in any of the last 2 years.
9. Company having negative Earning for last two consecutive years will not be considered.
10. Company falling under settlement category 'Z' will not be considered.
11. Financial Institution falling under the watch list of Bangladesh Bank will not be considered provided such information is available from an acceptable source.
12. Company failing to pay the listing fees for 2 years and/or if any penalty was imposed under the securities laws in last 2 years period will not be considered.
13. At least one company from each sector having minimum ten companies will be taken in the index if the scrip satisfies the above criteria and achieves the minimum point (**50 points**) as evaluated on the basis of the following Selection Criteria. The sector having less than seven companies will be considered to be a part of Miscellaneous Sector.

*On being qualified on the basis of the Basic Criteria, the companies are required to meet the following further Selection Criteria to have the final berth in CSE30 Index.*

### **SELECTION CRITERIA**

1. Higher Net Assets Value (NAV) per share
2. Higher rate of Earning Per Share (EPS)
3. Higher rate of Dividend
4. Lower Price Earning (PE) Ratio
5. Higher Dividend Yield (DY)
6. Higher rate of free floating in equity
7. Lower Price to Book Value Ratio

8. Higher liquidity in terms of trading day
9. Higher liquidity in terms of number of contracts
10. Longer duration of continuous remaining in the CSE-30 Index



### **CSE50 (Benchmark Index)**

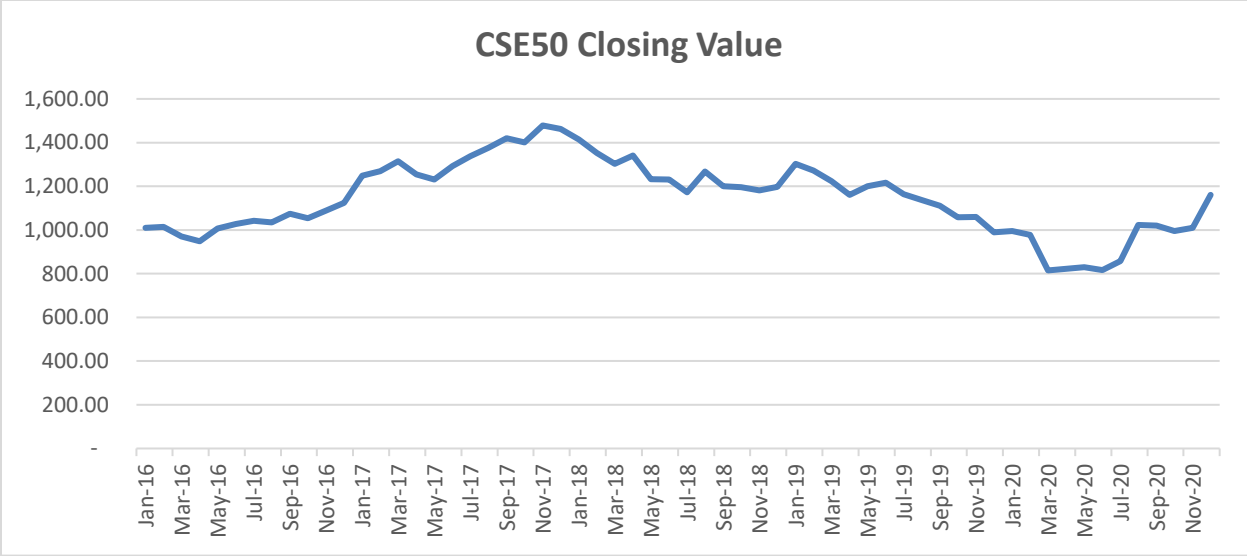
CSE50 (Benchmark Index) is constructed in order to provide an appropriate benchmark for Bangladesh capital market. The index is well diversified and constitutes 50 leading and active stocks to ensure coverage of large portion of market capitalization of Chittagong Stock Exchange (CSE). CSE 50 index can be used for a variety of purposes such as benchmarking fund portfolios, launching of index funds, ETFs and structured products.

### **Eligibility Criteria for Selection of Constituent Stocks of CSE50:**

- i) CSE listed securities other than Mutual Funds and Corporate bonds and securities which are classified under 'Z' category are eligible for index.
- ii) Companies should have traded for more than 75% of trading days during last 6 months period or from date of listing (whichever is latest).
- iii) The remaining companies are then ranked by traded values and bottom 10% companies are excluded.
- iv) Companies are then ranked by float adjusted market capitalization. Top 50 companies by market capitalization, from eligible universe satisfying criteria of liquidity are selected for index inclusion.

### **Index Re-Balancing**

Index is re-balanced on semi-annual basis. Data for 6 months ending June & December each year is considered for review.



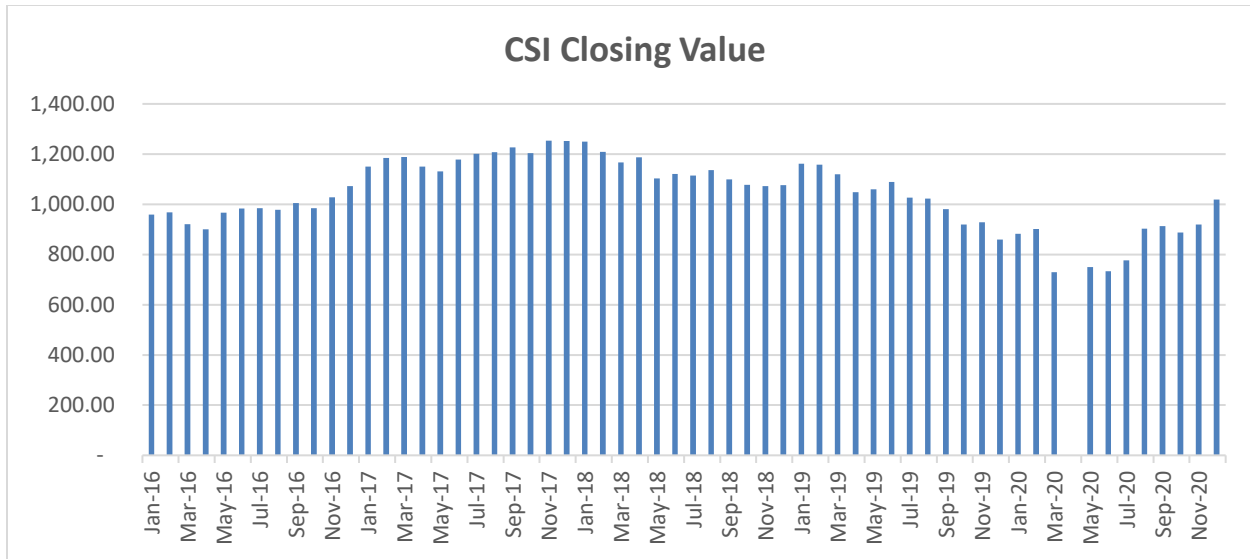
**CSE Shariah Index (CSI)**

The CSE Shariah Index is designed to offer investors shariah compliant investment solutions. The CSE Shariah Index comprises of all shariah compliant companies listed on CSE. The index does not have fixed number of companies and is reviewed on annual basis. Constituents that become non-shariah compliant are excluded from the index. The index shall have variable number of constituents. The CSE Shariah Index can be used for a variety of purposes such as benchmarking fund portfolios, launching of index funds, ETFs and structured products.

**Eligibility Criteria for Selection of Constituent Stocks of CSI:**

- i) Index comprises of shariah compliant stocks that form part of all companies listed on CSE other than Mutual Funds and Corporate bonds.
- ii) Shariah compliance screening is done on an annual basis. The index is reviewed on an annual basis with data ending June each year.
- iii) If any index constituent becomes non-shariah compliant or is delisted from the CSE, the same will undergo compulsory exclusion from the index.





### Index Calculation & Maintenance

All CSE indices are calculated using following formula:

Free-float market capitalization of index constituents/ Base Market capitalization \* Base Index Value

### Index Closure Algorithm

The closing index value on any trading day is computed taking the weighted average of all the trades of index constituents in the last 30 minutes of trading session. If an index constituent has not traded in the last 30 minutes, the weighted average price of last 50 trades is taken for computation of the index closure. If an index constituent has not traded at all in a day, then its last day's closing price is taken for computation of index closure. The use of index closure algorithm prevents any intentional manipulation of the closing index value.

### Maintenance of Index and CSE Index Committee for Review

One of the important aspects of maintaining continuity with the past is to update the base market capitalization. The base market capitalization adjustment ensures that replacement of stocks in Index, additional issue of capital and other corporate announcements like 'rights issue' etc. do not destroy the historical value of the index. The beauty of maintenance lies in the fact that adjustments for corporate actions in the Index should not per se affect the index values.

In addition, the free float methodology will require adjustment of Free Float factor (FFF) or Investible Weight factor (IWF) periodically.

CSE indices requires adjustments for events that result in changes in free float market capitalization. These events will include;

- (a) Inclusion/Deletion of stock in the Index

- (b) Adjustment of Equity Capital
- (c) Change in the Free Float factor (IWF)

CSE Index Advisory Committee reviews the CSE index series including float factors in every six months. The purpose of the Committee is to consider and advise on matters relating to and propose amendments to the Rules governing the management of the CSE Index Series and to ensure that best practice is used in the construction and ongoing management of the Indices.

- Index Committee is responsible for Broad Index Policy Framework and Guidelines. In particular the Committee:
  - a) ensures that global standards are applied in the Ground Rules,
  - b) advises on how to reconstruct or replace the existing index methodology,
  - c) oversees the ongoing management of the indices, corporate actions and changes to Ground Rules,
  - d) advises on the construction and methodology of new indices.
- Index Committee provides guidelines to CSE Index Cell who are responsible for the daily maintenance of the index as per the broad index policy framework set by the CSE Index Committee.
- The CSE Index Cell ensures that all CSE Indices maintain benchmark properties by striking the balance between frequent replacements in index and maintaining its historical continuity.

#### **On - Line Computation of the Index**

During trading hours, value of the indices is calculated and disseminated on real time basis. This is done automatically on the basis of prices at which trades in index constituents are executed.

#### **Review Period/Re-composition**

The indices are reviewed and/or re-composed on semi-annual basis.

#### **New Issues**

If a new issue is large enough, that the effectiveness of the index as a market indicator would be significantly and adversely affected by its omission, the new issue will be included as a constituent of the CSE Indices that it qualifies for after the close of business on the first day of official trading. In all cases, advance notification confirming the timing of the inclusion of the new constituent will be given accordingly.

For the purpose of this rule, a company which is re-listed following suspension or is reorganized or renamed or which arises from a de-merger or complex re-organization of another company which is not an existing constituent, shall not be considered to be a new issue. However, an Initial Public Offering (IPO) that arises from a de-merger will be considered as a new issue.

If the CSE Index Committee decides to include a new issue as a constituent security other than as part of the normal periodic review procedure, this decision must be publicly announced at the earliest practicable time.

### **Adjustment for Bonus, Rights, Split and Change in Issued Capital**

Index calculation needs to be adjusted for issue of rights issue. If no adjustments were made, a discontinuity would arise between the current value of the index and its previous value despite the non-occurrence of any economic activity of substance. At the CSE Index Cell, the base value is adjusted, which is used to alter market capitalization of the component stocks to arrive at the index value.

The CSE Index Cell keeps a close watch on the events that might affect the index on a regular basis and carries out daily maintenance of all CSE Indices.

### **Index Adjustment Guideline**

Following guidelines are followed by CSE to adjust the Indices for corporate actions and events:

#### **Guideline for Adjustments for Corporate Actions:**

##### **A. Adjustment for Cash Dividend:**

No adjustment is required for CSE All Share Price Index, CSCX, CSE 30 Index, CSE50, CSI and CSE Sector wise Indices. But for Total Return Index (if introduced in future), cash dividend is required to be adjusted.

In case of Special Cash Dividend (Dividend declared is more than 10% of the existing price of the stock), adjustment needs to be made to the base market capitalization. The dividend per share is subtracted from the current price of the share and new market capitalization is calculated using the theoretical price. No changes will be made to the Total Return Index.

##### **B. Adjustment for Stock Dividend:**

The indices have to be adjusted for stock dividend at the close of record date. Adjustments should include the adjusted price of stock and the new number of shares on the ex-dividend day.

Example:

Presently Company A has 300,000 free-float shares. Its stock price is Taka 240 on September 14, 2020. It declared 50% stock dividend with record date of September 15, 2020.

CSE Index on 15/9/20:	5,000
Free float market capitalization on 15/9/20	300,000,000
Divisor	600,000

Stock	No. of Free Float Shares	Stock Price (Taka)	Free Float Market Cap (Taka)
A	300,000	240	72,000,000
B	250,000	450	112,500,000
G	350,000	330	115,500,000
Total			300,000,000

Step 1: Estimate the closing adjusted price.

$$\begin{aligned} \text{Closing Adjusted Price} &= \frac{\text{Closing Stock Price}}{(1 + \text{Rate of Bonus})} \\ &= \frac{240}{(1 + 0.50)} \\ &= 160 \end{aligned}$$

Step 2: Determine the new number of free float shares.

$$\begin{aligned} \left( \begin{array}{c} \text{New Number of} \\ \text{Free Float Shares} \end{array} \right) &= \left( \begin{array}{c} \text{Existing Number of} \\ \text{Free Float Shares} \end{array} \right) \times (1 + \text{Rate of Bonus}) \\ &= 300,000 \times (1 + 0.50) \\ &= 450,000 \end{aligned}$$

Alternatively, it can be estimated as:

$$\begin{aligned} \left( \begin{array}{c} \text{New Number of} \\ \text{Free Float Shares} \end{array} \right) &= \left( \begin{array}{c} \text{Outstanding} \\ \text{Shares} \end{array} \right) \times (1 + \text{Rate of Bonus}) \times \text{FF} \\ &= 600,000 \times (1 + 0.5) \times 0.50 \\ &= 450,000 \end{aligned}$$

Step 3: On the close of September 15, 2020 (record date), change the composition as follows:

New Index Composition:

Stock	No. of Free Float Shares	Stock Price (Taka)	Free Float Market Cap (Taka)
A	450,000	160	72,000,000
B	250,000	450	112,500,000
G	350,000	330	115,500,000
Total			300,000,000

No divisor adjustment will be necessary. Opening Index will remain unchanged on 16/9/20 due to this adjustment.

### C. Adjustment for Right:

In case of a right issue by a company, there is need for adjustment of ex-right price and the number of free float shares. To be precise, adjustments for right will be necessary in two stages:-

- (a) at the close of record date.
- (b) at the close of subscription of right shares.

But for the sake of simplicity, a single adjustment on the second record date is recommended. Adjustment should be made with respect to stock price and number of free float shares.

Example:

Presently Company A has 300,000 free-float shares. Its stock price is Taka 240 on September 14, 2020. It declared 1R:2 (50%) right with second record date of September 15/9/20 after BSEC approval. Right offer price Taka 600.

CSE Index on 15/9/20:	5,000
Free float market capitalization on 15/9/20	300,000,000
Divisor	600,000

Present Index Composition:

Stock	No. of Free Float Shares	Stock Price (Taka)	Free Market Cap (Taka)	Float Cap
A	300,000	240	72,000,000	
B	250,000	450	112,500,000	
G	350,000	330	115,500,000	
Total			300,000,000	

Step 1: Determine the Ex-right price:

$$\begin{aligned} \left( \begin{array}{c} \text{Ex Right} \\ \text{Price} \end{array} \right) &= \frac{\left( \begin{array}{c} \text{Cum Right Closing} \\ \text{Stock price prior to} \\ \text{2nd record date} \end{array} \right) + (\text{Rate of Right} \times \text{Offer Price})}{(1 + \text{Rate of Right})} \\ &= \frac{240 + (0.5 \times 600)}{(1 + 0.5)} \\ &= 360 \end{aligned}$$

Step 2: Determine the diluted new number of free float shares.

$$\begin{aligned} \left( \begin{array}{c} \text{New Number of} \\ \text{Free Float Shares} \end{array} \right) &= \left( \begin{array}{c} \text{Existing Number of} \\ \text{Free Float Shares} \end{array} \right) \times (1 + \text{Rate of Right}) \\ &= 300,000 \times (1 + 0.50) \\ &= 450,000 \end{aligned}$$

New Index Composition:

Stock	No. of Free Float Shares	Stock Price (Taka)	Free Float Market Cap (Taka)
A	450,000	360	162,000,000
B	250,000	450	112,500,000
G	350,000	330	115,500,000
Total			390,000,000

Step 3: Estimate the Divisor Adjustment:

$$\begin{aligned} \text{New Divisor} &= \frac{\text{Revised Free Float Market Capitalization}}{\text{Closing CSE Index on Record Date}} \\ &= \frac{390,000,000}{5000} \\ &= 78,000 \end{aligned}$$

Step 4: Estimate the Opening CSE Index on September 16, 2020

$$\begin{aligned} \left( \begin{array}{c} \text{Opening CSE Index} \\ \text{on Ex Right Date} \end{array} \right) &= \frac{\left( \begin{array}{c} \text{Revised Free Float} \\ \text{Market Capitalization} \end{array} \right)}{\text{New Divisor}} \\ &= \frac{390,000,000}{78,000} \\ &= 5,000 \end{aligned}$$

CSE Index remains unchanged at the opening of next trading day.

Other Corporate Actions that will require Index/ Stock Adjustment:

- (a) Bond Conversion / Preferred Stock Conversion into common stock
- (b) Increase in the number of shares due to stock warrants
- (c) Mergers and Acquisitions
- (d) Stock Split / Reverse Split
- (e) Spin off / Split Off / Split up
- (f) Stock Buyback

### Inclusion of New stock in the Index:

The new stock should be included in the index after the close of first day trading. This means that there will be no impact of the new stock's price change on the first day of trading of IPO in the secondary market. At the closing of first day, the new divisor has to be estimated.

Example:

Company N enters the secondary market on 15/9/20. The company has 450,000 free-float shares. On 15/9/20, its closing price was Taka 400.

CSE Index on 15/9/20:	5000
Free float market cap (without new IPO) on 15/9/20	300,000,000
Divisor	600,000

Present Index Composition:

Stock	No. of Free Float Shares	Stock Price (Taka)	Free Float Market Cap (Taka)
A	300,000	240	72,000,000
B	250,000	450	112,500,000
G	350,000	330	115,500,000
Total			300,000,000

Step1:

Estimate the revised free float market capitalization with the new IPO.

Revised Index Composition:

Stock	No. of Free Float Shares	Stock Price (Taka)	Free Float Market Cap (Taka)
A	300,000	240	72,000,000
B	250,000	450	112,500,000
G	350,000	330	115,500,000
N	450,000	400	180,000,000
Total			480,000,000

Step 2: Estimate the new divisor:

$$\begin{aligned} \text{New Divisor} &= \frac{\left( \text{Revised Free Float Market Capitalization} \right)}{\left( \text{Closing CSE Index on the first day of trading of new IPO} \right)} \\ &= \frac{480,000,000}{5000} \\ &= 96,000 \end{aligned}$$

Step 3: Estimate the Opening CSE Index on September 16, 2020

$$\begin{aligned} \left( \text{Opening CSE Index on the} \right. & \left. \frac{\left( \text{Revised Free Float} \right)}{\left( \text{Market Capitalization} \right)} \right) \\ \left( \text{second day of IPO trading} \right) & = \frac{\text{New Divisor}}{\text{New Divisor}} \\ & = \frac{480,000,000}{96,000} \\ & = 5,000 \end{aligned}$$

CSE Index remains unchanged after the inclusion of new IPO.