



ตลาดหลักทรัพย์แห่งประเทศไทย
The Stock Exchange of Thailand

Index Methodology

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The Stock Exchange of Thailand

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INDEX METHODOLOGY

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The Stock Exchange of Thailand calculates the SET Index (composite index) and all its index series in accordance with the method mentioned in this document. If any event not described below occurs or the SET decides it is impossible to use the following method, the SET will use an alternative method of calculation it deems valid.

Calculation Methodology

SET Index is a composite market capitalization-weighted price index which compares the current market value (CMV) of all listed common stocks with its market value on the base date of April 30, 1975 (BMV), which was when the SET Index was established. The SET Index had set at 100 points on the Base date.

$$\text{SET Index} = \frac{\text{Current Market Value}}{\text{Base Market Value}} \times 100$$

Index Constituents

The SET index calculated based on all common stocks (including unit trusts of property funds) traded on the main board. Any stock subject to a trading halt is included at the last price before such a halt.

Exception: Those stocks that have been suspended trading for more than 1 year are excluded from the index calculation.

Base Adjustment Methodology

In the event of any increase or decrease in the current market value due to reasons other than fluctuations in the stock market such as public offering or changes in the number of component stocks, The SET will make necessary adjustments to the Base Market Value in order to eliminate all effects other than price movements from the index.

<p>Index after Adjustment = Index before Adjustment</p> $\frac{CMV_N}{BMV_N} = \frac{CMV_O}{BMV_O}$ $BMV_N = \frac{CMV_N}{CMV_O} \times BMV_O$ $BMV_N = \frac{CMV_N}{CMV_N - Adjusted\ Value} \times BMV_O$

Where

BMV_O = Base Market Value before adjustment

CMV_O = Current Market Value before adjustment

BMV_N = Base Market value after adjustment

CMV_N = Current Market Value after adjustment

Events that require adjustments, dates of adjustments, and stock prices employed for adjustments are as follows:

Event	Adjustment Date	Adjusted Price
New listing	EOD on first trading date	1st day closing price
Delisting	EOD before Delisting date	Closing price on the day before the Delist date
Capital Increase		
Right Offering	In-the-Money Right, Ex-right date	Offering price
	Out-of-the-Money Right, No adjustment.	-
Public Offering Private Placement	Effective when stocks is traded, and Adjust at EOD on effective date	Prior price of effective date
Capital Decrease	EOD before effective date	
Change Market	EOD before effective date	Closing price on the day before the effective date
Index Exclusion	EOD before effective date	Closing price on the day before the effective date
Index Inclusion	EOD on first trading date	1st day closing price

In the case of a cash dividend and stock split, no adjustment is made to the base market value.

Examples of SET Index calculation methodology

Day 1. Base date

Assumption: There are 3 common stocks listed with SET.

Stock A 100,000 shares, par = THB100, market price = THB110

Stock B 300,000 shares, par = THB100, market price = THB160

Stock C 200,000 shares, par = THB100, market price = THB120

$$\begin{aligned}\text{Index}(1) &= \frac{CMV}{BMV} \times 100 \\ &= \frac{\sum_{i=1}^n P_{it} Q_{it}}{\sum_{i=1}^n P_{io} Q_{io}} \\ &= \frac{(110 \times 100,000) + (160 \times 300,000) + (120 \times 200,000)}{(110 \times 100,000) + (160 \times 300,000) + (120 \times 200,000)} \times 100 \\ &= \frac{83,000,000}{83,000,000} \times 100 \\ &= 100\end{aligned}$$

Day 2. Market price change

The market prices of stocks A, B and C change to THB120, THB170, and THB110, respectively. The second day's Index then becomes:

$$\begin{aligned}\text{Index}(2) &= \frac{CMV}{BMV} \times 100 \\ &= \frac{(120 \times 100,000) + (170 \times 300,000) + (110 \times 200,000)}{83,000,000} \times 100 \\ &= \frac{85,000,000}{83,000,000} \times 100 \\ &= 102.41\end{aligned}$$

Day 3. New listing of stock D

The market prices of stocks A, B and C change to THB 110, THB 170 and THB 120, respectively. In addition, stock D is a newly listed stock this day, with 150,000 shares and closing price of THB140.

When new stock is listed on the SET or any stock has been included to the SET Index, the number of listed stocks and the Market Value will be affected. The SET will adjust the Base Market Value according to that changes on the end-of-day process by employing the closing price of that stock on the first trading day. Hence, the price movement of stock D is not included in the index on the first day. The Index then becomes:

$$\begin{aligned}
\text{Index}(3) &= \frac{CMV}{BMV} \times 100 \\
&= \frac{(110 \times 100,000) + (170 \times 300,000) + (120 \times 200,000)}{83,000,000} \times 100 \\
&= \frac{86,000,000}{83,000,000} \times 100 \\
&= 103.61
\end{aligned}$$

Then, the base Market Value for index calculation on Day 4 will be

$$\begin{aligned}
BMV_N &= BMV_O \times \frac{CMV_N}{CMV_O} \\
&= 83,000,000 \times \frac{(110 \times 100,000) + (170 \times 300,000) + (120 \times 200,000) + (140 \times 150,000)}{(110 \times 100,000) + (170 \times 300,000) + (120 \times 200,000)} \\
&= 83,000,000 \times \frac{107,000,000}{86,000,000} \\
&= 103,267,441
\end{aligned}$$

Comparison of SET Index before and after the adjustment:

$$\begin{aligned}
\frac{CMV_N}{BMV_N} &= \frac{CMV_O}{BMV_O} \\
\frac{107,000,000}{103,267,441} &= \frac{86,000,000}{83,000,000} \\
103.61 &= 103.61
\end{aligned}$$

Day 4. Market prices change

Market prices of Stock A, B, C and D change to THB 120, THB 180, THB 120 and THB 130, respectively. The Index then becomes:

$$\begin{aligned}
\text{Index}(4) &= \frac{CMV}{BMV} \times 100 \\
&= \frac{(120 \times 100,000) + (180 \times 300,000) + (120 \times 200,000) + (130 \times 150,000)}{103,267,441} \times 100 \\
&= \frac{109,500,000}{103,267,441} \times 100 \\
&= 106.04
\end{aligned}$$

Effective on Day 5, company C will be delisted from the SET. When any stock will be delisted or decreased its shares, the number of listed shares and the Market Value will be affected. The SET will adjust the Base Market Value according to that changes in the end-of-day process (EOD) of the day prior to the effective date by employing the closing price of the stock on that day.

Then, The Base Market Value for Index calculation on Day 5 will be

$$\begin{aligned}
 BMV_N &= BMV_o \times \frac{CMV_N}{CMV_o} \\
 &= 103,267,441 \times \frac{(120 \times 100,000) + (180 \times 300,000) + (130 \times 150,000)}{(120 \times 100,000) + (180 \times 300,000) + (120 \times 200,000) + (130 \times 150,000)} \\
 &= 103,267,441 \times \frac{85,500,000}{109,500,000} \\
 &= 80,633,481
 \end{aligned}$$

Day 5. Delisting of Stock C

Market prices of stock A, B and D change to THB 130, THB 180 and THB 140, respectively.

So, the index value in Day 5 is:

$$\begin{aligned}
 \text{Index}(5) &= \frac{CMV}{BMV} \times 100 \\
 &= \frac{(130 \times 100,000) + (180 \times 300,000) + (140 \times 150,000)}{80,633,481} \times 100 \\
 &= \frac{88,000,000}{80,633,481} \times 100 \\
 &= 109.14
 \end{aligned}$$

Day 6. Par Splitting

Effective on Day6, Stock A will split its par value from THB100 to THB50. However, this event will not take any effect on the Index Calculation as mentioned earlier

Market prices of Stock A, B and D change to THB 75, THB 180 and THB 150, respectively: The Index on Day 6 is:

$$\begin{aligned}
 \text{Index}(6) &= \frac{CMV}{BMV} \times 100 \\
 &= \frac{(75 \times 200,000) + (180 \times 300,000) + (150 \times 150,000)}{80,633,481} \times 100 \\
 &= \frac{91,500,000}{80,633,481} \times 100 \\
 &= 113.48
 \end{aligned}$$

Day 7. Capital increase by right issuing to existing shareholders (Ex-right day)

Company D will increase its capital by 150,000 shares through the right offering to the existing shareholders which the Ex-right day is set on Day 7. Shareholders are offered a right to buy a new share at exercise price of THB100 for each share they hold. (XR 1:1 @ THB100)

On Day7, Closing prices of Stock A, B and D change to THB 80, THB 170 and THB 130, respectively:

The index value in Day 7 is

$$\begin{aligned}
 \text{Index}(7) &= \frac{CMV}{BMV} \times 100 \\
 &= \frac{(80 \times 200,000) + (170 \times 300,000) + [(130 \times 300,000) - (100 \times 150,000)]}{80,633,481} \times 100 \\
 &= \frac{91,000,000}{80,633,481} \times 100 \\
 &= 112.86
 \end{aligned}$$

When any stock increases its capital through a right offering, The SET have 2 different procedures for the event. Firstly, the right offering will be considered. In case where the right is in the money (Subscription price is less than the prior closing price), the SET will adjust the Base Market Value in the EOD process on the ex-rights day by employing the Subscription price:

If the rights are in the money, SET will adjust the base market value on the ex-rights (XR) effective date by using the exercise price to adjust the base market value:

$$BMV_N = BMV_O \times \frac{CMV_N}{CMV_N - (\text{Subscription price} \times \text{New shares issued})}$$

In case where the right is out of the money, the SET will take no adjustment to the Base Market Value on that day. If there are investors who exercise their rights, the Base Market Value will be adjusted where the additional shares are listed to the SET by employing the same method as Public offerings

For this case, the right is considering as in the money right ($100 < 150$). Then, Base Market Value for next Day (8) will be:

$$\begin{aligned}
 BMV_N &= BMV_O \times \frac{CMV_N}{CMV_N - (\text{Subscription Price} \times \text{New shares issued})} \\
 &= 80,633,481 \times \frac{(80 \times 200,000) + (170 \times 300,000) + (130 \times 300,000)}{[(80 \times 200,000) + (170 \times 300,000) + (130 \times 300,000)] - (100 \times 150,000)} \\
 &= 80,633,481 \times \frac{106,000,000}{91,000,000} \\
 &= 93,924,714
 \end{aligned}$$

Comparison of SET Index before and after the adjustment:

$$\begin{aligned}
 \frac{CMV_N}{BMV_N} &= \frac{CMV_O}{BMV_O} \\
 \frac{106,000,000}{93,924,714} &= \frac{91,000,000}{80,633,481} \\
 112.86 &= 112.86
 \end{aligned}$$

Day 8. Public offerings (PO) and Private placements (PP)

Company B increases its capital by 100,000 shares through Private Placement. 50,000 shares are allotted to company's Directors at THB150 and other 50,000 shares are allotted to employees at THB100. On Day8, Closing prices of stock A, B and D change to THB 80, THB 160 and THB 140, respectively. The index value in Day8 is:

$$\begin{aligned}\text{Index}(8) &= \frac{CMV}{BMV} \times 100 \\ &= \frac{[(80 \times 200,000) + (160 \times 400,000) + (140 \times 300,000)] - [170 \times 100,000]}{93,924,714} \times 100 \\ &= \frac{122,000,000}{93,924,714} \times 100 \\ &= 111.79\end{aligned}$$

When company increase its shares through the public offering or private placement, The SET will adjust the Base Market Value according to that changes in the end-of-day process by employing the prior price of that stock and applying the following formula.

$$BMV_N = BMV_O \times \frac{CMV_N}{CMV_N - (\text{Prior price} \times \text{New shares issued})}$$

Base Market Value for index calculation on Day(9):

$$\begin{aligned}BMV_N &= BMV_O \times \frac{CMV_N}{CMV_N - (\text{Prior Price} \times \text{New shares issued})} \\ &= 93,924,714 \times \frac{(80 \times 200,000) + (160 \times 400,000) + (140 \times 300,000)}{[(80 \times 200,000) + (160 \times 400,000) + (140 \times 300,000)] - [170 \times 100,000]} \\ &= 93,924,714 \times \frac{122,000,000}{105,000,000} \\ &= 109,131,572\end{aligned}$$

Day 9. Variations in market price

At the market close, prices of stock A, B and D change to THB 85, THB 150 and THB 135, respectively: The Index value then becomes:

$$\begin{aligned}\text{Index}(9) &= \frac{CMV}{BMV} \times 100 \\ &= \frac{(85 \times 200,000) + (150 \times 400,000) + (135 \times 300,000)}{109,131,572} \times 100 \\ &= \frac{117,500,000}{109,131,572} \times 100 \\ &= 107.67\end{aligned}$$

Effective on Day 10, Company D will decrease its capital by decreasing its 100,000 shares. When company decreases its shares, The SET will adjust the Base Market Value according to that changes by applying the same

method as stock delisting. The adjustment will be taken in the end-of-day process on the day prior to the effective date by employing the close price of that stock on the day. This method also applied to the case of par partially or totally unexercised rights by decreasing the unexercised amount.

Base Market value for index calculation on Day 10:

$$\begin{aligned}
 BMV_N &= BMV_O \times \frac{CMV_N}{CMV_O} \\
 &= 109,131,572 \times \frac{(85 \times 200,000) + (150 \times 400,000) + (135 \times 300,000) - (135 \times 100,000)}{(85 \times 200,000) + (150 \times 400,000) + (135 \times 300,000)} \\
 &= 109,131,572 \times \frac{104,000,000}{117,500,000} \\
 &= 96,593,050
 \end{aligned}$$

Day 10. Capital decrease

Market prices of stock A, B and D change to THB 80, THB 160 and THB 100, respectively. The Index value then becomes:

$$\begin{aligned}
 \text{Index}(10) &= \frac{CMV}{BMV} \times 100 \\
 &= \frac{(80 \times 200,000) + (160 \times 400,000) + (100 \times 200,000)}{96,593,050} \times 100 \\
 &= \frac{100,000,000}{96,593,050} \times 100 \\
 &= 103.53
 \end{aligned}$$

Effective on Day11, Company M will upgrade its listing status from Market for Alternative Investment (mai) to list on the Stock Exchange of Thailand. Stock M is traded in mai on Day10 for the last day with 150,000 listed shares at a closing price of THB50.

When a stock moves from MAI to SET on Day11, SET will instantly include that stock into the SET Index from its first trading day on the SET onward. Accordingly, the SET will adjust the Base Market Value for the SET Index in EOD process on the last day it traded on MAI by employing the close price as adjusted price. For mai Index that stock will be treated as delisted stock. Likewise, the change of stock from one sector to another also uses the same method but the adjustment will be taken to the relevant sector only.

Base Market Value for index calculation on Day11:

$$\begin{aligned} BMV_N &= BMV_O \times \frac{CMV_N}{CMV_O} \\ &= 96,593,050 \times \frac{(80 \times 200,000) + (160 \times 400,000) + (100 \times 200,000) + (50 \times 150,000)}{(80 \times 200,000) + (160 \times 400,000) + (100 \times 200,000)} \\ &= 96,593,050 \times \frac{107,500,000}{100,000,000} \\ &= 103,837,528 \end{aligned}$$

Day 11. Change Market

Market prices of stock A, B, D and M change to THB 85, THB 150, THB 120 and THB65, respectively:

The Index value then becomes:

$$\begin{aligned} \text{Index}(11) &= \frac{CMV}{BMV} \times 100 \\ &= \frac{(85 \times 200,000) + (150 \times 400,000) + (120 \times 200,000) + (65 \times 150,000)}{103,837,528} \times 100 \\ &= \frac{110,750,000}{103,837,528} \times 100 \\ &= 106.66 \end{aligned}$$
