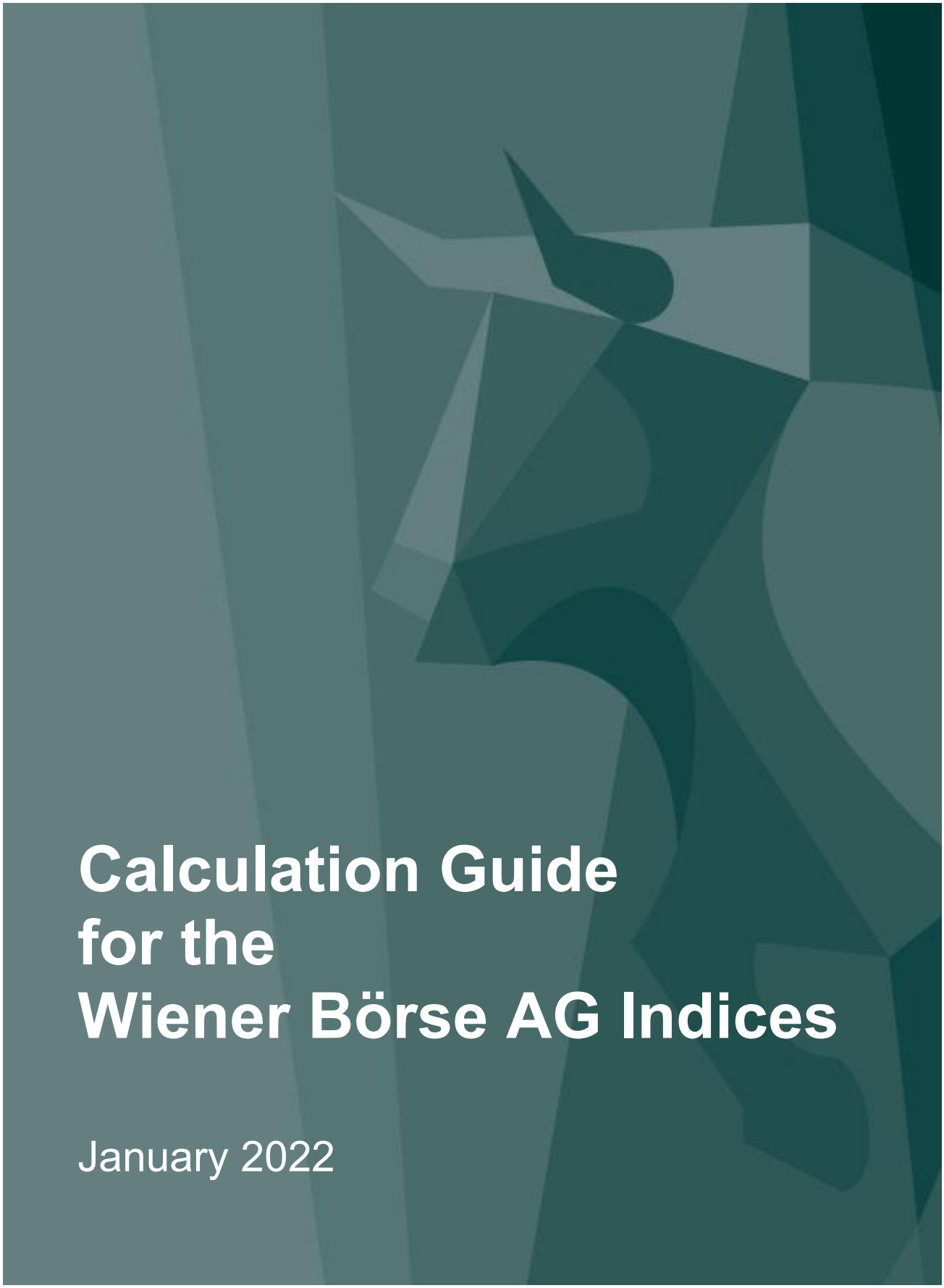
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Calculation Guide for the Wiener Börse AG Indices

January 2022

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1. Index Formulas

1.1. Formula of a Price Index

A Price Index is calculated on the basis of the following formula:

$$Capitalization_t = \sum_{i=1}^{N} (P_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t})$$

$P_{i,}$ .....Price of i^{th} Stock in EUR
Q_i.....Number of Shares of i^{th} stock
FF_i .....Free Float Factor of i^{th} stock
RF_i.....Representation Factor of i^{th} stock
N .....Number of Companies contained in the index
t .....Time of Index Calculation

$$Index_t = Base\ Value * \left[\frac{Capitalization_t}{Base\ Capitalization} \right] * AF_t$$

Index .....Value of the Index
AF .....Adjustment Factor of the Index
t .....Time of Index Calculation

In case of an index adjustment (f.e. capital increase, dividend payment etc.), a new adjustment factor has to be calculated.

$$Capitalization'_t = \sum_{i=1}^{N} (P'_{i,t} * Q'_{i,t} * FF'_{i,t} * RF'_{i,t})$$

$P'_{i,}$.....Price of i^{th} Stock in EUR after adjustment
Q'_i.....Number of Shares of i^{th} stock after adjustment
FF'_i .....Free Float Factor of i^{th} stock after adjustment
RF'_i.....Representation Factor of i^{th} stock after adjustment
N .....Number of Companies contained in the index
t .....Time of Index Calculation

$$AF'_t = AF_t * \left[\frac{Capitalization_t}{Capitalization'_t} \right]$$

AF .....Adjustment Factor of the Index before adjustment
AF'.....Adjustment Factor of the Index after adjustment
N .....Number of Companies contained in the index
t .....Time of Index Calculation (adjustment day)

1.2. Formula of a Total Return Index

A Total Return Index is calculated on the basis of the following formula:

$$Capitalization_t = \sum_{i=1}^{N} (P_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t})$$

$P_{i,}$ .....Price of i^{th} Stock
Q_i.....Number of Shares of i^{th} stock
FF_i .....Free Float Factor of i^{th} stock
RF_i.....Representation Factor of i^{th} stock
N .....Number of Companies contained in the index
t .....Time of Index Calculation

$$Index_t = Base\ Value * \left[\frac{Capitalization_t}{Base\ Capitalization} \right] * AF_t$$

Index .....Value of the Index
AF .....Adjustment Factor of the Index
t .....Time of Index Calculation

In case of an index adjustment (f.e. capital increase, dividend payment etc.), a new adjustment factor has to be calculated.

$$Capitalization'_t = \sum_{i=1}^{N} [(P'_{i,t} - Div_{i,t}) * Q'_{i,t} * FF'_{i,t} * RF'_{i,t}]$$

$P'_{i,}$.....Price of i^{th} Stock after adjustment (except dividend adjustment)
$Div_{i,}$.....Dividend of i^{th} Stock
Q'_i.....Number of Shares of i^{th} stock after adjustment
FF'_i .....Free Float Factor of i^{th} stock after adjustment
RF'_i.....Representation Factor of i^{th} stock after adjustment
N .....Number of Companies contained in the index
t .....Time of Index Calculation

$$AF'_t = AF_t * \left[\frac{Capitalization_t}{Capitalization'_t} \right]$$

AF .....Adjustment Factor of the Index before adjustment
AF'.....Adjustment Factor of the Index after adjustment
N .....Number of Companies contained in the index
t .....Time of Index Calculation (adjustment day)

1.3. Formula of a Dividend Point Index

A dividend point index is calculated on the basis of the following formula:

Calculation of the dividend capitalization:

$$DA_t = \sum_{i=1}^{N} Div_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t}$$

DA_t .....Dividend Capitalization
$Divi_{i,t}$.....Dividend of i^{th} stock
Q_i.....Number of Shares of i^{th} stock
FF_i .....Free Float Factor of i^{th} stock
RF_i.....Representation Factor of i^{th} stock
N .....Number of Companies contained in the index
t .....Day of Index Calculation

The DA is calculated in the evening before the ex-date, after the close of the index calculation of the base index and after the implementation of any other corporate action that will be effective the next day. Thus, for the calculation of the dividend points, the new calculation factors, as well as the new adjustment factor or divisor will be used.

Calculation of the dividend point index:

$$DVP_t = DVP_{t-1} + Base\,Value\left[\frac{DA_t}{Base\ Capitalization}\right] * AF_t$$

DVP.....Value of dividend point index
Base Value.....Base Value of base index
DA_t .....Dividend Capitalization
Base Capitalization ..Base Capitalization of base index
AF .....Adjustment Factor of base index
t .....Day of Index Calculation

Alternative calculation of the dividend point index:

$$DVP_t = DVP_{t-1} + \left[\frac{DA_t}{D_t}\right]$$

DVP.....Value of dividend point index
D .....Divisor of base index
t .....Day of Index Calculation

1.4. Formula of a Short Index

A Short Index is calculated on the basis of the following formula:

$$Index_t = Index_{t-1} * \left(1 + LF * \left(\frac{Capitalization_t}{Capitalization'_{t-1}} - 1\right) + (1 - LF) * \left(\frac{€STR_t}{360}\right) * d\right)$$

Index .....Value of the Short Index
LF.....Leverage Factor (negative)
Capitalization…… ...Capitalization of the Short Index
Capitalization'…….....Capitalization of the Short Index after all possible index adjustments
€STR.....Value of the benchmark rate €STR
t…… ...Time of Index Calculation (current calculation day)
t-1……....Last calculation day before t
d .....Number of days between time t and time t-1

$$Capitalization'_{t-1} = \sum_{i=1}^{N} [(P'_{i,t-1} - Div_{i,t-1}) * Q'_{i,t-1} * FF'_{i,t-1} * RF'_{i,t-1}]$$

$P'_{i,}$.....Price of i^{th} Stock after adjustment (except dividend adjustment)
$Div_{i,}$.....Dividend of i^{th} Stock
Q'_i.....Number of Shares of i^{th} stock after adjustment
FF'_i .....Free Float Factor of i^{th} stock after adjustment
RF'_i.....Representation Factor of i^{th} stock after adjustment
N .....Number of Companies contained in the index
t…… ...Time of Index Calculation (current calculation day)
t-1……....Last calculation day before t

1.5. Formula of a Leverage Index

A Leverage Index is calculated on the basis of the following formula:

$$Index_t = Index_{t-1} * \left(1 + LF * \left(\frac{Capitalization_t}{Capitalization'_{t-1}} - 1\right) + (1 - LF) * \left(\frac{€STR_t + SPREAD_T}{360}\right) * d\right)$$

Index .....Value of the Leverage Index
LF .....Leverage Factor
Capitalization…… ...Capitalization of the Leverage Index
Capitalization'…….....Capitalization of the Leverage Index after all possible index adjustments
€STR.....Value of the benchmark rate €STR
SPREAD .....Interest rate spread over the benchmark rate €STR
t…… ...Time of Index Calculation (current calculation day)
t-1……....Last calculation day before t
T.....Time of last update to the interest rate spread (monthly)
d .....Number of days between time t and time t-1

$$Capitalization'_{t-1} = \sum_{i=1}^{N} [(P'_{i,t-1} - Div_{i,t-1}) * Q'_{i,t-1} * FF'_{i,t-1} * RF'_{i,t-1}]$$

P'$_{i,}$.....Price of ith Stock after adjustment (except dividend adjustment)
Div$_{i,}$.....Dividend of ith Stock
Q'$_i$.....Number of Shares of ith stock after adjustment
FF'$_i$ .....Free Float Factor of ith stock after adjustment
RF'$_i$.....Representation Factor of ith stock after adjustment
N .....Number of Companies contained in the index
t…… ...Time of Index Calculation (current calculation day)
t-1……....Last calculation day before t

1.6. Formula of a Distributing Index

A Distributing Index is calculated on the basis of the following formula:

$$Index_t = BaseValue * \left[\frac{Capitalization_t}{BaseCapitalization} \right] * AF_t + C_t$$

Index .....Value of the Distributing Index
Capitalization……. ...Capitalization of the Distributing Index
AF .....Adjustment Factor of the Distributing index
C .....Cash component
t…… ...Time of index calculation (current calculation day)

Calculation of the cash component:

$$C_t = C_{t-1} * \left[1 + \left(\frac{€STR_t}{360} \right) * d \right] + DP_t$$

€STR.....Value of the benchmark rate €STR
DP .....Dividend points (non-zero on ex-dividend dates)
t-1……....Last calculation day before t
d .....Number of days between time t and time t-1

The dividend points are unequal to zero in the event of a stock goes ex-dividend on the calculation day. They are calculated in the evening of the previous day, after the close of the index calculation and after the implementation of any other corporate action that will be effective the next day. Thus, for the calculation of the dividend points, the new calculation factors, as well as the new adjustment factor or divisor will be used:

$$DP_t = BaseValue * \left[\frac{\sum_{j=1}^{M} Div_{j,t} * Q_{j,t} * FF_{j,t} * RF_{j,t}}{BaseCapitalization} \right] * AF_t$$

$Divi_{j,}$.....Net dividend of j^{th} stock with ex-dividend date equals t
Q_j.....Number of Shares of j^{th} stock
FF_j .....Free Float Factor of j^{th} stock
RF_j.....Representation Factor of j^{th} stock
M .....Number of Companies with ex-dividend date equals t

1.7. Formula of a Daily Settlement Price Index

A Daily Settlement Price Index is calculated on the basis of the following formula:

If there was a trade in a contract:

$$Daily\ Settlement\ Price\ Index_t = Contract * \left[\frac{Underlying_c}{Underlying_t}\right]$$

Daily Settlement Price..... Value of the Daily Settlement Price Index
Contract……. ..... Value of contract
c ..... Time at close of trading (current calculation day)
t…… ..... Time of last trade in contract (current calculation day)

If there was no trade in a contract, but new quotes:

$$Daily\ Settlement\ Price\ Index_t = Best\ Mid\ Bid / Ask\ Quote * \left[\frac{Underlying_c}{Underlying_t}\right]$$

Daily Settlement Price..... Value of the Daily Settlement Price Index
Best Mid Bid/Ask Quote… Mid of last best quote
c ..... Time at close of trading (current calculation day)
t…… ..... Time of last trade in contract (current calculation day)

If there was no trade in a contract and no new quotes:

$$Daily\ Settlement\ Price\ Index_t = Underlying_c + (Underlying * \frac{Interest\ Rate}{360} * d)$$

Daily Settlement Price..... Value of the Daily Settlement Price Index
Interest Rate……. ..... 12 Month Interest Rate (EURIOBOR, LIBOR, etc.)
c ..... Time at close of trading (current calculation day)
d…… ..... Time to maturity of concerned contract

2.

3. Examples

2.1. Calculation of a Price Index

Example: Calculation of CECE Composite Index in EUR (Composition of 17 February 2011)

Company	Country	Shares	FFF	RF	Currency	Price local	Capitalization in EUR
KOMERCNI BANKA	CZ	38,009,852	0.40	1.00	EURCZK	4,160.00	2,598,804,057
CENTRAL EUROP. MEDIA ENT.	CZ	56,846,176	0.60	1.00	EURCZK	332.10	465,420,402
CEZ	CZ	537,989,759	0.40	0.55	EURCZK	809.00	3,934,316,068
ERSTE GROUP BANK AG	CZ	378,176,721	0.70	0.39	EURCZK	930.80	3,948,551,885
NEW WORLD RESOURCES	CZ	264,433,565	0.40	1.00	EURCZK	266.00	1,156,064,974
PEGAS NONWOVENS	CZ	9,229,400	1.00	1.00	EURCZK	449.00	170,272,238
TELEFONICA O2 CR	CZ	322,089,890	0.40	1.00	EURCZK	394.50	2,088,373,278
PHILIP MORRIS	CZ	1,913,698	0.30	1.00	EURCZK	9,450.00	222,920,753
EGIS	HU	7,785,715	0.50	1.00	EURHUF	21,650.00	311,987,728
FHB MORTGAGE BANK	HU	66,000,000	0.50	1.00	EURHUF	1,044.00	127,533,871
RICHTER GEDEON	HU	18,637,486	0.70	0.66	EURHUF	39,505.00	1,259,193,509
MOL	HU	104,518,484	0.40	0.45	EURHUF	22,300.00	1,553,036,184
MAGYAR TELEKOM	HU	1,042,742,543	0.50	1.00	EURHUF	530.00	1,022,902,102
OTP BANK	HU	280,000,000	0.80	0.31	EURHUF	5,730.00	1,472,907,381
ASSECO POLAND	PL	77,565,530	0.70	1.00	EURPLN	49.80	690,395,602
BANK PEKAO	PL	262,364,326	0.50	1.00	EURPLN	160.50	5,375,906,335
BIOTON	PL	5,290,376,196	0.80	1.00	EURPLN	0.17	183,707,689
BRE BANK	PL	42,056,277	0.40	1.00	EURPLN	310.00	1,331,540,495
BZ WBK	PL	73,076,013	0.30	1.00	EURPLN	223.70	1,252,171,896
GETIN HOLDING	PL	713,785,319	0.40	1.00	EURPLN	12.50	911,254,078
KGHM	PL	200,000,000	0.70	1.00	EURPLN	165.50	5,915,996,425
GRUPA LOTOS	PL	113,630,889	0.50	1.00	EURPLN	40.50	587,520,874
POLIMEX MOSTOSTAL	PL	464,285,575	0.70	1.00	EURPLN	3.57	296,246,560
POLSKA GRUPA ENERGETYCZNA	PL	1,869,783,727	0.40	1.00	EURPLN	22.65	4,325,351,862
PGNIG	PL	5,899,944,750	0.30	1.00	EURPLN	3.72	1,681,179,201
PKN ORLEN	PL	427,709,061	0.70	1.00	EURPLN	43.90	3,355,929,898
PKO BP	PL	740,000,000	0.90	1.00	EURPLN	41.00	6,972,041,363
PZU	PL	86,340,692	0.50	1.00	EURPLN	337.50	3,720,156,205
TELEKOM POLSKA	PL	1,335,649,021	0.50	1.00	EURPLN	16.75	2,856,136,998
TVN	PL	161,837,122	0.50	1.00	EURPLN	16.55	341,938,513
							60,129,758,424

Base Value: 746.46
Base Capitalization: 10,568,117,162.00
Adjustment Factor: 0.493006300557079

$$Index_t = Base\ Value * \left[\frac{\sum_{i=1}^{N} (P_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t})}{Base\ Capitalization} \right] * AF_t$$

$$Index_t = 746.46 * \left[\frac{60,129,758,424}{10,568,117,162} \right] * 0,493006300557079$$

$$Index_t = 2,093.88$$

2.2. Calculation of a Short Index

Example:

Base Value:	1,000
Base Capitalization:	10,000,000
Leverage Factor	1
Adjustment Factor:	1
€STR:	1.5%

Day 1:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.50	2,175,000
Share B	400,000	0.50	1.00	10.70	2,140,000
Share C	700,000	0.30	1.00	15.00	3,150,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					10,585,000

$$Short\ Index_t = 1{,}058.50$$

Day 2:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.00	2,100,000
Share B	400,000	0.50	1.00	10.70	2,140,000
Share C	700,000	0.30	1.00	15.80	3,318,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					10,678,000

$$Short\ Index_t = Short\ Index_{t-1} * \left(1 + LF * \left(\frac{Capitalization_t}{Capitalization'_{t-1}} - 1\right) + (1 - LF) * \left(\frac{EONIA_{t-1}}{360}\right) * d\right)$$

$$Short\ Index_t = 1{,}058.50 * \left(1 + (-1) * \left(\frac{10{,}678{,}000}{10{,}585{,}000} - 1\right) + (1 - (-1)) * \left(\frac{0.015}{360}\right) * 1\right)$$

$$Short\ Index_t = 1{,}049.29$$

2.3. Calculation of a Leverage Index

Example:

Base Value:	1,000
Base Capitalization:	10,000,000
Leverage Factor	4
Adjustment Factor:	1
€STR:	0.35%
SPREAD:	1.08%

Day 1:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.50	2,175,000
Share B	400,000	0.50	1.00	10.70	2,140,000
Share C	700,000	0.30	1.00	15.00	3,150,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					10,585,000

$$Leverage\ Index_t = 1{,}058.50$$

Day 2:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.00	2,100,000
Share B	400,000	0.50	1.00	10.70	2,140,000
Share C	700,000	0.30	1.00	15.80	3,318,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					10,678,000

$$Leverage\ Index_t = Leverage\ Index_{t-1} * \left(1 + LF * \left(\frac{Capitalization_t}{Capitalization'_{t-1}} - 1\right) + (1 - LF) * \left(\frac{EONIA_{t-1} + SPREAD_T}{360}\right) * d\right)$$

$$Leverage\ Index_t = 1{,}058.50 * \left(1 + 4 * \left(\frac{10{,}678{,}000}{10{,}585{,}000} - 1\right) + (1 - 4) * \left(\frac{0.0035 + 0.0108}{360}\right) * 1\right)$$

$$Leverage\ Index_t = 1{,}095.57$$

2.4. Calculation of a Distributing Index

Example:

Base Value:	1,000
Base Capitalization:	10,000,000
Adjustment Factor:	1
Cash component t-1:	9.450453
Dividend Points:	2.45
€STR:	0.35%

Current index capitalization:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.00	2,100,000
Share B	400,000	0.50	1.00	10.70	2,140,000
Share C	700,000	0.30	1.00	15.80	3,318,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					10,678,000

Calculation of the cash component:

$$C_t = C_{t-1} * \left[1 + \left(\frac{EONIA_t}{360}\right) * d\right] + DP_t$$

$$C_t = 9.450453 * \left[1 + \left(\frac{0.0035}{360}\right) * 1\right] + 2.45$$

$$C_t = 11.900545$$

Calculation of the index value:

$$Index_t = BaseValue * \left[\frac{Capitalization_t}{BaseCapitalization}\right] * AF_t + C_t$$

$$Index_t = 1{,}000 * \left[\frac{10{,}678{,}000}{10{,}000{,}000}\right] * 1 + 11.900545$$

$$Index_t = 1{,}079.70$$

2.5. Stock Split

Index before Stock Split Adjustment:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.00	2,100,000
Share B	400,000	0.50	1.00	10.50	2,100,000
Share C	700,000	0.30	1.00	16.00	3,360,000
Share D	800,000	0.50	1.00	7.50	3,000,000
					10,560,000

Index after Stock Split Adjustment:

Company	Shares	FFF	RF	Price	Capitalization
Share A	600,000	0.50	1.00	7.00	2,100,000
Share B	400,000	0.50	1.00	10.50	2,100,000
Share C	700,000	0.30	1.00	16.00	3,360,000
Share D	800,000	0.50	1.00	7.50	3,000,000
					10,560,000

The adjustment factor does not change because the capitalization of the index remains the same.

The adjustment of a reverse stock split is done analogously.

2.6. Capital Increase – Soft Underwriting

Company B has decided to issue 5,000,000 shares at 10 EUR so that the total number of shares will rise from 6,000,000 to 11,000,000 shares. The subscription rights have a value of 0.50 per share. Neither an organizing bank nor a shareholder has agreed to buy any remaining shares that might not be subscribed for.

Base Value: 1,000.00
Base Capitalization: 100,000,000.00
Adjustment Factor: 1.00

before adjustment:

Company	Shares	FFF	RF	Price	Capitalization
Share A	10,000,000	0.50	1.00	12.00	60,000,000
Share B	6,000,000	0.50	1.00	10.00	30,000,000
Share C	7,000,000	0.25	1.00	15.00	26,250,000
Share D	8,000,000	0.50	1.00	8.00	32,000,000
					148,250,000

$$Index_t = Base\ Value * \left[\frac{\sum_{i=1}^{N} (P_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t})}{Base\ Capitalization} \right] * AF_t$$

Index .....Value of the Index
$P_{i,}$ .....Price of i^{th} Stock in EUR
Q_i.....Number of Shares of i^{th} stock
FF_i .....Free Float Factor of i^{th} stock
RF_i.....Representation Factor of i^{th} stock
N .....Number of Companies contained in the index
AF .....Adjustment Factor of the Index
t.....Time of Index Calculation

$$Index_t = 1{,}000 * \left[\frac{148{,}250{,}000}{100{,}000{,}000} \right] * 1$$

$$Index_t = 1{,}482.50$$

Index on the evening before the ex-date:

before adjustment

Company	Shares	FFF	RF	Price	Capitalization
Share A	10,000,000	0.50	1.00	12.00	60,000,000
Share B	6,000,000	0.50	1.00	10.00	30,000,000
Share C	7,000,000	0.25	1.00	15.00	26,250,000
Share D	8,000,000	0.50	1.00	8.00	32,000,000
					148,250,000

after adjustment

Company	Shares	FFF	RF	Price	Capitalization
Share A	10,000,000	0.50	1.00	12.00	60,000,000
Share B	6,000,000	0.50	1.00	9.50	**28,500,000**
Share C	7,000,000	0.25	1.00	15.00	26,250,000
Share D	8,000,000	0.50	1.00	8.00	32,000,000
					146,750,000

A new Adjustment Factor (AF) has to be calculated after the close of the index calculation because the index capitalization has changed due to the subscription rights mark down.

$$AF'_t = AF_t * \left[\frac{Capitalization_t}{Capitalization'_t} \right]$$

Capitalization.....Capitalization of the Index before adjustment
Capitalization'.....Capitalization of the Index after adjustment
t.....Time of Index Calculation (adjustment day)

$$AF'_t = 1 * \left[\frac{148{,}250{,}000}{146{,}750{,}000} \right]$$

$$AF'_t = 1.0102214651$$

The higher AF equals the effect of the subscription rights mark down. The index value remains unchanged:

$$Index'_t = 1{,}000 * \left[\frac{146{,}750{,}000}{100{,}000{,}000} \right] * 1.0102214651$$

$$Index'_t = 1{,}482.50$$

The new number of shares will be adjusted after their registration:

before adjustment

Company	Shares	FFF	RF	Price	Capitalization
Share A	10,000,000	0.50	1.00	14.00	70,000,000
Share B	6,000,000	0.50	1.00	8.00	24,000,000
Share C	7,000,000	0.25	1.00	17.00	29,750,000
Share D	8,000,000	0.50	1.00	8.50	34,000,000
					157,750,000

after adjustment

Company	Shares	FFF	RF	Price	Capitalization
Share A	10,000,000	0.50	1.00	14.00	70,000,000
Share B	11,000,000	0.50	1.00	8.00	**44,000,000**
Share C	7,000,000	0.25	1.00	17.00	29,750,000
Share D	8,000,000	0.50	1.00	8.50	34,000,000
					177,750,000

$$AF'_t = 1 * \left[\frac{157{,}750{,}000}{177{,}750{,}000}\right]$$

$$AF'_t = 0.88748241 \quad 91$$

The lower AF levels out the higher index capitalization due to the increase in the number of shares of Company B. The index level remains unchanged:

$$Index'_t = 1.000 * \left[\frac{177{,}750{,}000}{100{,}000{,}000}\right] * 0.8874824191$$

$$Index'_t = 1{,}577.50$$

2.7. Capital Increase – Hard Underwriting

Company B has decided to issue 5,000,000 shares at 10 EUR so that the total number of shares will rise from 6,000,000 to 11,000,000 shares. The subscription rights have a value of 0.50 per share. A main shareholder has guaranteed to subscribe to all remaining shares that have not been subscribed for.

Base Value:	1,000.00
Base Capitalization:	100,000,000.00
Adjustment Factor:	1.00

before adjustment:

Company	Shares	FFF	RF	Price	Capitalization
Share A	10,000,000	0.50	1.00	12.00	60,000,000
Share B	6,000,000	0.50	1.00	10.00	30,000,000
Share C	7,000,000	0.25	1.00	15.00	26,250,000
Share D	8,000,000	0.50	1.00	8.00	32,000,000
					148,250,000

$$Index_t = Base\ Value * \left[\frac{\sum_{i=1}^{N} (P_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t})}{Base\ Capitalization} \right] * AF_t$$

Index .....Value of the Index
$P_{i,}$ .....Price of i^{th} Stock in EUR
Q_i.....Number of Shares of i^{th} stock
FF_i .....Free Float Factor of i^{th} stock
RF_i.....Representation Factor of i^{th} stock
N .....Number of Companies contained in the index
AF .....Adjustment Factor of the Index
t .....Time of Index Calculation

$$Index_t = 1{,}000 * \left[\frac{148{,}250{,}000}{100{,}000{,}000} \right] * 1$$

$$Index_t = 1{,}482.50$$

Subscription rights mark down together with the adjustment of all new shares in the evening before the ex-date:

before adjustment

Company	Shares	FFF	RF	Price	Capitalization
Share A	10,000,000	0.50	1.00	12.00	60,000,000
Share B	6,000,000	0.50	1.00	10.00	30,000,000
Share C	7,000,000	0.25	1.00	15.00	26,250,000
Share D	8,000,000	0.50	1.00	8.00	32,000,000
					148,250,000

after adjustment

Company	Shares	FFF	RF	Price	Capitalization
Share A	10,000,000	0.50	1.00	12.00	60,000,000
Share B	11,000,000	0.50	1.00	9.50	**52,250,000**
Share C	7,000,000	0.25	1.00	15.00	26,250,000
Share D	8,000,000	0.50	1.00	8.00	32,000,000
					170,500,000

It is necessary to calculate a new Adjustment Factor (AF) in order to reflect the change in the index capitalization due to the higher number of shares and the subscription rights mark down.

$$AF'_t = AF_t * \left[\frac{Capitalization_t}{Capitalization'_t} \right]$$

Capitalization.....Capitalization of the Index before adjustment
Capitalization'.....Capitalization of the Index after adjustment
t.....Time of Index Calculation (adjustment day)

$$AF'_t = 1 * \left[\frac{148{,}250{,}000}{170{,}500{,}000} \right]$$

$$AF'_t = 0.86950146\ \ 63$$

The lower AF equals the effect of the new number of shares and the subscription rights mark down. The index value remains unchanged:

$$Index'_t = 1.000 * \left[\frac{170{,}500{,}000}{100{,}000{,}000} \right] * 0.8695014663$$

$$Index'_t = 1{,}482.50$$

2.8. Dividend Adjustment

Base Value: 1,000
Base Capitalization: 10,000,000
Adjustment Factor: 1

Share A pays a dividend of 0.50.

Index before Dividend Adjustment:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.50	2,175,000
Share B	400,000	0.50	1.00	10.70	2,140,000
Share C	700,000	0.30	1.00	15.80	3,318,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					10,753,000

$$Index_t = Base\ Value * \left[\frac{\sum_{i=1}^{N} (P_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t})}{Base\ Capitalization} \right] * AF_t$$

Index .....Value of the Index
$P_{i,}$ .....Price of i^{th} Stock
Q_i.....Number of Shares of i^{th} stock
FF_i .....Free Float Factor of i^{th} stock
RF_i.....Representation Factor of i^{th} stock
N .....Number of Companies contained in the index
AF .....Adjustment Factor of the Index
t .....Time of Index Calculation

$$Index_t = 1{,}000 * \left[\frac{10{,}753{,}000}{10{,}000{,}000} \right] * 1$$

$$Index_t = 1{,}075.30$$

Index after Dividend Adjustment:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.00	2,100,000
Share B	400,000	0.50	1.00	10.70	2,140,000
Share C	700,000	0.30	1.00	15.80	3,318,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					10,678,000

A new Adjustment Factor needs to be calculated because the index capitalization has changed.

$$AF'_t = AF_t * \left[\frac{Capitalization_t}{Capitalization'_t} \right]$$

Capitalization .....Capitalization of the Index before adjustment
Capitalization'.....Capitalization of the Index after adjustment
t.....Time of Index Calculation (adjustment day)

$$AF'_t = 1 * \left[\frac{10{,}753{,}000}{10{,}678{,}000} \right]$$

$$AF'_t = 1.007023787$$

$$Index'_t = 1{,}000 * \left[\frac{10{,}753{,}000}{10{,}678{,}000} \right] * 1.007023787$$

$$Index'_t = 1{,}075.30$$

2.9. Dividend Point Calculation

Base Value (Base Index)	1,000
Base Capitalization (Base Index):	1,000,000,000
Adjustment Factor (Base Index):	1.00
Value of DVP index t-1	65.12

Share A pays a dividend of 1.75.

Index before Dividend Adjustment:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.50	2,175,000

Calculation of the Dividend Capitalization:

$$DA_t = \sum_{i=1}^{N} Div_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t}$$

DA .....Dividend Capitalization
Div_i .....Dividend of i^{th} Stock
Q_i.....Number of Shares of i^{th} stock
FF_i .....Free Float Factor of i^{th} stock
RF_i.....Representation Factor of i^{th} stock
N .....Number of Companies contained in the index
t .....Time of Index Calculation

$$DA_t = 1.75 * 300,000 * 0.50 * 1.00$$
$$DA_t = 262,500$$

Calculation of the dividend point index:

$$DVP_t = DVP_{t-1} + BaseValue\left[\frac{DA_t}{Base\ Capitalization}\right] * AF_t$$

DVP_t.....Value of dividend point index on day t
DVP_{t-1}.....Value of dividend point index on day t-1
Base Capitalization ..Base Capitalization of base index on day t
AF_t.....Adjustment Factor of base index on day t
Base Value.....Base Value of base index

$$DVP_t = 65.12 + 1,000\left[\frac{262,500}{1,000,000,000}\right] * 1$$
$$DVP_t = 65.12 + 0.26$$
$$DVP_t = 65.38$$

2.10. Inclusion of a Company

Base Value: 1,000.00
Base Capitalization: 10,000,000.00
Adjustment Factor: 1.00

Index before Inclusion of Share B:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.50	2,175,000
Share C	700,000	0.30	1.00	15.80	3,318,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					8,613,000

$$Index_t = Base\,Value * \left[\frac{\sum_{i=1}^{N} (P_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t})}{Base\ Capitalization} \right] * AF_t$$

Index .....Value of the Index
$P_{i,}$ .....Price of i^{th} Stock
Q_i.....Number of Shares of i^{th} stock
FF_i .....Free Float Factor of i^{th} stock
RF_i.....Representation Factor of i^{th} stock
N .....Number of Companies contained in the index
AF .....Adjustment Factor of the Index
t .....Time of Index Calculation

$$Index_t = 1{,}000 * \left[\frac{8{,}613{,}000}{10{,}000{,}000} \right] * 1$$

$$Index_t = 861.30$$

Index after Inclusion of Share B:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.50	2,175,000
Share B	400,000	0.50	1.00	10.70	2,140,000
Share C	700,000	0.30	1.00	15.80	3,318,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					10,753,000

$$AF'_t = AF_t * \left[\frac{Capitalization_t}{Capitalization'_t} \right]$$

Capitalization.....Capitalization of the Index before adjustment
Capitalization'.....Capitalization of the Index after adjustment
t.....Time of Index Calculation (adjustment day)

$$AF'_t = 1 * \left[\frac{8{,}613{,}000}{10{,}753{,}000} \right]$$

$$AF'_t = 0.80098577\ \ 1412629$$

$$Index'_t = 1{,}000 * \left[\frac{10{,}753{,}000}{10{,}000{,}000} \right] * 0.800985771412629$$

$$Index'_t = 861.30$$

2.11. Exclusion of a Company

Base Value: 1,000.00
Base Capitalization: 10,000,000.00
Adjustment Factor: 1.00

Index before Exclusion of Share B:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.50	2,175,000
Share B	400,000	0.50	1.00	10.70	2,140,000
Share C	700,000	0.30	1.00	15.80	3,318,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					10,753,000

$$Index_t = Base\ Value * \left[\frac{\sum_{i=1}^{N} (P_{i,t} * Q_{i,t} * FF_{i,t} * RF_{i,t})}{Base\ Capitalization} \right] * AF_t$$

Index .....Value of the Index
$P_{i,}$ .....Price of i^{th} Stock
Q_i.....Number of Shares of i^{th} stock
FF_i .....Free Float Factor of i^{th} stock
RF_i.....Representation Factor of i^{th} stock
N .....Number of Companies contained in the index
AF .....Adjustment Factor of the Index
t .....Time of Index Calculation

$$Index_t = 1{,}000 * \left[\frac{10{,}753{,}000}{10{,}000{,}000} \right] * 1$$

$$Index_t = 1{,}075.30$$

Index after Exclusion of Share B:

Company	Shares	FFF	RF	Price	Capitalization
Share A	300,000	0.50	1.00	14.50	2,175,000
Share C	700,000	0.30	1.00	15.80	3,318,000
Share D	800,000	0.50	1.00	7.80	3,120,000
					8,613,000

$$AF'_t = AF_t * \left[\frac{Capitalization_t}{Capitalization'_t} \right]$$

Capitalization.....Capitalization of the Index before adjustment
Capitalization'.....Capitalization of the Index after adjustment
t.....Time of Index Calculation (adjustment day)

$$AF'_t = 1 * \left[\frac{10{,}753{,}000}{8{,}613{,}000} \right]$$

$$AF'_t = 1.24846162\ \ 777197$$

$$Index'_t = 1{,}000 * \left[\frac{8{,}613{,}000}{10{,}000{,}000} \right] * 1.24846162777197$$

$$Index'_t = 1{,}075.30$$

2.12. Calculation of a Daily Settlement Price

1. If there was a trade in a contract:

Last trade at	1,000
Underlying at last trade	950
Underlying at close of trading	960
Percentage change	1.053%

$$Daily\ Settlement\ Price\ Index_t = Contract * \left[\frac{Underlying_c}{Underlying_t} \right]$$

Daily Settlement Price..... Value of the Daily Settlement Price Index
Contract……. ..... Value of contract
c ..... Time at close of trading (current calculation day)
t…… ..... Time of last trade in contract (current calculation day)

$$Daily\ Settlement\ Price\ Index_t = 1{,}000 * \left[\frac{960}{950} \right]$$

$$Daily\ Settlement\ Price\ Index_t = 1{,}000 * 1.01053$$

$$Daily\ Settlement\ Price\ Index_t = 1{,}010.53$$

2. If there was no trade in a contract, but new quotes:

Bid/Ask Mid at	955
Bid	945
Ask	965
Underlying at quotation	950
Underlying at close of trading	960
Percentage change	1.053%

$$Daily\ Settlement\ Price\ Index_t = Best\ Mid\ Bid/Ask\ Quote * \left[\frac{Underlying_c}{Underlying_t} \right]$$

Daily Settlement Price..... Value of the Daily Settlement Price Index
Best Mid Bid/Ask Quote… Mid of last best quote
c ..... Time at close of trading (current calculation day)
t…… ..... Time of last trade in contract (current calculation day)

$$Daily\ Settlement\ Price\ Index_t = 955 * \left[\frac{960}{950} \right]$$

$$Daily\ Settlement\ Price\ Index_t = 955 * 1.01053$$

$$Daily\ Settlement\ Price\ Index_t = 965.05$$

3. If there was no trade in a contract and no new quotes:

Time to Maturity	90
EURIBOR 12 Month (360)	0.00544
Underlying at close of trading	960

$$Daily\ Settlement\ Price\ Index_t = Underlying_c + (Underlying * \frac{Interest\ Rate}{360} * d)$$

Daily Settlement Price..... Value of the Daily Settlement Price Index
Interest Rate……. ..... 12 Month Interest Rate (EURIOBOR, LIBOR, etc.)
c ..... Time at close of trading (current calculation day)
d…… ..... Time to maturity of concerned contract

$$Daily\ Settlement\ Price\ Index_t = 960 + (960 * \frac{0.00544}{360} * 90)$$

$$Daily\ Settlement\ Price\ Index_t = 960 + 1.31$$

$$Daily\ Settlement\ Price\ Index_t = 961.31$$

Contact Details

The Index Management of Wiener Börse AG is responsible for the ongoing operations, controlling the index calculation and the passing on of index values via the data providers. Furthermore, the Index Management informs market participants about any adjustments of the composition of the index and/or calculation parameters. The Index Management implements Index Committee decisions and is responsible for contacting voting members if required.

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