



Guide to the LPX Equity Indices  
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Designed to represent

**Alternative Asset Classes.**



# Guide to the LPX Equity Indices

LPX Group

2016

## Notice and Disclaimer<sup>1</sup>

Listed private equity (LPE) constitutes the liquid part of the asset class private equity. Among the different structures of LPE, it can be distinguished between LPE fund managers, direct LPE investment companies and LPE fund of funds. This can be compared to the unlisted private equity market where single dominant structure prevails: the limited partnerships (L.P.). This well-known structure, as well as direct LPE companies and LPE fund of funds have in common that they regularly publish a so called “fair value” or “net asset value” (NAV). This concept is misleading in the case of LPE fund managers and thus not applied.

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The Guide sets out the ground rules for the construction and maintenance of the LPX index family. The objective is to design, create and maintain a series of high quality indices, which can be used as benchmarks by the global investment community and as an underlying for tailored financial products.

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## 1 General Index Information

LPX Group was the first to publish a Listed Private Equity (LPE) index family. LPX Group provides global LPE indices that have become the most widely used in the financial industry in particular by institutional investors. The index family contributes to the investment process by serving as a relevant and adequate performance benchmark and as an effective research tool. Moreover, the index family provides a basis for various alternative investment vehicles. The LPX index family fulfils the needs of institutional and private market participants. Thereby, the design, development and delivery of the LPX indices ensure that they are investable, tradable and transparent being key factors that underlie their commercial success.

### 1.1 LPX - Listed Private Equity Index Family

The LPX - Listed Private Equity Index Family consists of global, regional, and style indices, which are outlined in the following. The composition of the indices in terms of eligible index constituents follows the rules as described in Section 2.

#### LPX Composite

The LPX Composite is a broad global LPE index whose number of constituents is not limited. The LPX Composite thus describes the development of the whole liquid LPE universe covered by LPX Group that fulfils pre-defined liquidity criteria.

#### LPX50

The LPX50 is a global index that consists of the 50 largest liquid LPE companies covered by LPX Group.

#### LPX Major Market

The LPX Major Market represents the most actively traded LPE companies covered by LPX Group.

#### LPX Buyout

The LPX Buyout represents the most actively traded LPE companies covered by LPX Group whose business model consists mainly in the appropriation of buyout capital or in the investment in such funds.

#### LPX Mezzanine

The LPX Mezzanine represents the most actively traded LPE companies covered by LPX Group whose business model consists mainly in the appropriation of mezzanine capital or in the investment in such funds.

#### LPX Venture

The LPX Venture represents the most actively traded LPE companies covered by LPX Group whose core business lies mainly in the provision of venture capital or in the investment in venture capital funds.

**LPX Direct**

The LPX Direct represents the most actively traded LPE companies covered by LPX Group that mainly pursue a direct private equity investment strategy. A listed private equity company is an eligible candidate for the Index if its direct private equity investments, as well as cash and cash equivalent positions and post-Initial Public Offering listed investments, represent more than 80% of the total assets of the company. LPX Group considers direct private equity investments to be direct investments noted on the balance sheet of the listed private equity company in the equity, mezzanine or debt facility of an underlying private company or investments in limited partnerships managed by the management portion of the listed private equity company.

**LPX FoF**

The LPX FoF<sup>2</sup> (Fund of Funds) represents the largest liquid LPE companies covered by LPX Group that mainly pursue an indirect private equity investment strategy through PE limited partnerships.

**LPX America**

The LPX America represents the most actively traded LPE companies covered by LPX Group that are listed on an exchange in North America.

**LPX Europe**

The LPX Europe represents the most actively traded LPE companies covered by LPX Group that are listed on a European exchange.

**LPX UK**

The LPX UK represents the largest liquid LPE companies covered by LPX Group that are listed on an exchange in the UK.

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<sup>2</sup>Formerly known as the LPX Indirect index.

## 1.2 Reference Date, Weighting and Cap

The reference date (base date) is chosen such that a minimum of 10 initial constituents is ensured. LPX indices are calculated according to the calculation algorithm described in Section 3 of this Guide. In order to limit the weight of individual constituents in the indices, a cap (the variable is defined as "CAP" in this Guide) is set for the market capitalisation of any single constituent of the index (see Section 3 for details). If the number of constituents of an index is 15 or more, a cap of 15% or less is implemented for any single constituent (see Table 1 for the current cap of the respective index). An overview of the characteristics of the LPX indices is presented in Table 1.

| Index                      | Maximum Constituents | Reference date | CAP | Chaining date                      |
|----------------------------|----------------------|----------------|-----|------------------------------------|
| LPX Composite              | n.a.                 | 31.12.2001     | 10% | 14.06 and 14.12                    |
| LPX50                      | 50                   | 31.12.1993     | 10% | 14.06 and 14.12                    |
| LPX Major Market           | 25                   | 31.12.1997     | 10% | 14.01 and 14.07                    |
| LPX Buyout                 | 30                   | 31.12.1993     | 10% | 14.02 and 14.08                    |
| LPX Mezzanine              | 30                   | 31.12.2003     | 10% | 14.02 and 14.08                    |
| LPX Venture                | 30                   | 31.12.1993     | 15% | 14.02 and 14.08                    |
| LPX Direct                 | 30                   | 31.12.1998     | 10% | 14.02 and 14.08                    |
| LPX Direct US <sup>a</sup> | 30                   | 31.12.1998     | 10% | 14.01 and 14.04<br>14.07 and 14.10 |
| LPX FoF                    | 30                   | 31.12.1999     | 10% | 14.02 and 14.08                    |
| LPX America                | 30                   | 31.12.1997     | 10% | 14.03 and 14.09                    |
| LPX Europe                 | 30                   | 31.12.1993     | 10% | 14.03 and 14.09                    |
| LPX UK                     | 30                   | 31.12.1998     | 10% | 14.03 and 14.09                    |

**Table 1:** Characteristics of the LPX Index Family

<sup>a</sup> The capping methodology for the LPX Direct is outlined in Section 3.4.

## 1.3 Prices

Official closing prices from the primary stock exchange of the respective index constituent security are used for the calculation of the LPX indices. The previous day's value of all indices is calculated and published on a daily basis. In the event of a suspension during trading hours, the last price determined before such a suspension is used for subsequent calculations. If such suspension occurs before the start of trading, the closing price of the previous day is used. In the event of an exchange holiday, the closing prices from the previous day are used. LPX Group publishes the indices for every day except for Saturdays and Sundays. The index holidays are communicated in advance via appropriate channels.

## 1.4 Calculation Frequency

LPX Group also offers real-time prices for all LPX indices, which are available via the data providers Thomson Reuters and Bloomberg. For details on the underlying data provider mnemonics refer to Section 6. LPX Group also offers customized closing files for clients and product partners that are tailored to their special needs.

## 1.5 Country Allocation

The LPX base universe includes companies that are traded at exchanges worldwide. The base universe is continuously reviewed and new eligible companies are added in accordance to Section 2.1. The universe of eligible index constituents of the LPX index series are traded on the following stock exchanges.<sup>3</sup>

| Country       | Exchange           |
|---------------|--------------------|
| Australia     | ASX                |
| Austria       | VSX                |
| Belgium       | BSE                |
| Brazil        | Bovespa            |
| Canada        | TSX                |
| Denmark       | OMX Copenhagen     |
| Finland       | OMX Helsinki       |
| France        | Euronext Paris     |
| Germany       | Xetra              |
| Germany       | FWB                |
| Great Britain | AIM(LSE)           |
| Great Britain | LSE                |
| Greece        | ASE                |
| HongKong      | HKSE               |
| Ireland       | ISE                |
| Italy         | Borsa Italiana     |
| Japan         | JASDAQ             |
| Japan         | TSE                |
| Netherlands   | Euronext Amsterdam |
| Singapore     | SGX                |
| South Africa  | JSE                |
| Spain         | Bolsade Madrid     |
| Sweden        | OMX Stockholm      |
| Switzerland   | SWX                |
| USA           | NASDAQ             |
| USA           | NYSE               |

**Table 2:** Eligible Index Constituents - Global Stock Exchanges

<sup>3</sup>LPX Group reserves the right to add further exchanges to the list above.

## 1.6 Currency Conversion

The foreign exchange rates used in the calculation of the LPX Listed Private Equity indices are the WM/Reuters Closing Spot Rates, compiled by the WM Company. At short intervals before and after 16:00h London (UK) time, representative bid and offer rates against the US dollar for some 112 currencies are selected from a wide range of contributing banks and foreign exchange dealers. In the event that WM/Reuters Closing Spot Rates are not published by the WM Company, the previous day's rates will be used to calculate the LPX Listed Private Equity Indices.

## 1.7 Error Correction Policy

The objective is to maintain the LPX indices to the highest standards of accuracy and integrity, using reliable data sources and following best practice in statistical and operational procedures. Where material errors occur in data or in calculation procedures, these are corrected promptly. However, LPX Group is conscious of the risk of damaging the confidence of users through the frequent publication of amendments where trivial statistical errors have occurred that do not materially affect the accuracy of the published index series.

# 2 Choice of Index Constituents

## 2.1 Data Basis

A database of LPE companies listed worldwide, to the extent known to LPX Group, serves as the base universe for the construction of LPX index family. In order to be eligible for the inclusion in the database, the predominant business purpose of the company (at least 50% of total assets) must lie in the area of Private Equity (stake in companies not admitted for exchange quotation). Total assets are calculated by LPX Group on a daily basis through a standardised model that is applied to every company of the universe. The Private Equity part contains direct Private Equity investments, indirect Private Equity investments ("limited partnerships"), the valuation of the Private Equity fund management business as well as the position "cash & cash equivalents" and "listed investments". Additionally the company must be quoted at a stock exchange. Within the framework of a continuous research process, LPX Group checks whether a company currently in the base universe is still an eligible constituent or whether new companies that have previously not been considered should be included.

## 2.2 Liquidity Analysis (LA)

The composition of the LPX indices is the result of a regularly occurring liquidity analysis (LA). Therefore, liquidity is defined as how often and in what volume a company is traded on an exchange. Annual averages are used for the individual criteria for liquidity (see Section 2.2). These criteria ensure the ability to replicate the indices. The following ratios are calculated within the framework of this analysis.

### Ratios

The specific liquidity ratios are:

- a maximum average bid-ask spread (BAS)
- an average minimum market capitalisation [mEUR] (MV)



- an average minimum trading volume per trading day measured relative to the market capitalisation (TV)
- a minimum trade continuity (CT)

### Rankings

It is determined, which companies fulfil the criteria from Section 2.2. Afterwards two ranking lists are put together:

- Ranking that is oriented to market capitalisation (A): The companies that fulfil the criteria are brought into a ranking list according to their market capitalisation (at the time of the liquidity analysis).
- Ranking that is oriented to the average (relative or absolute) trading volume (B): The companies that fulfil the criteria are brought into a ranking list according to their average trading volume. The average trading volume is calculated with the daily data of the previous year (see Section 2.2). A high rank is allocated to a company with a high average trading volume, while a low rank attends with a low average trading volume.

### Criteria

The following table summarizes the criteria that are applied to each of the indices. In the event a company does not fulfil one of the criteria, the company is not eligible for inclusion in the respective index, which means that the criteria are so-called "KO criteria".<sup>4</sup>

| LPX Index        | BAS  | TV                       | MV  | CT   | Ranking <sup>b</sup> |
|------------------|------|--------------------------|-----|------|----------------------|
| LPX Composite    | 4.0% | 0.03%/0.05% <sup>a</sup> | 20  | >75% | A                    |
| LPX50            | 3.0% | 0.05%                    | 80  | >80% | A                    |
| LPX Major Market | 1.5% | 0.08%                    | 150 | >95% | B                    |
| LPX Buyout       | 1.5% | 0.08%                    | 150 | >95% | B                    |
| LPX Mezzanine    | 3.0% | 0.08%                    | 80  | >80% | B                    |
| LPX Venture      | 4.0% | 0.06%                    | 20  | >75% | B                    |
| LPX Direct       | 1.5% | 0.08%                    | 150 | >95% | B                    |
| LPX FoF          | 4.0% | 0.06%                    | 20  | >75% | B                    |
| LPX America      | 3.0% | 0.08%                    | 80  | >80% | B                    |
| LPX Europe       | 3.0% | 0.06%                    | 80  | >80% | B                    |
| LPX UK           | 4.0% | 0.06%                    | 20  | >75% | B                    |

**Table 3:** Ratios of Liquidity Analysis

<sup>a</sup> different values for leaving/entering the index.

<sup>b</sup> Ranking that is oriented to the market capitalisation (at the time of the liquidity analysis) refers to Ranking A; Ranking that is oriented to the average (relative or absolute) trading volume refers to Ranking B.

<sup>4</sup>LPX Group reserves the right to deviate from these criteria.

**Time and Frequency of the Liquidity Analysis**

The liquidity analysis is carried out twice a year on the first trading day in December and June on every year. Potential index changes become effective at the respective index chaining date for each index is presented in Table 1. Underlying minimum data history for the liquidity analysis is 1 year of financial market data.

### Ordinary Adjustment

An ordinary adjustment of the LPX indices takes place after each LA. Specifically, it takes place half-yearly (quarterly) on the respective chaining date (see Table 1) of each index. Companies that no longer fulfil one of the “KO criteria” from Section 2.2 are replaced. In such a case, the successor is the company with the highest rank better than “ $n$ ”<sup>5</sup> that was not previously included in the index, where “ $n$ ” indicates the number of companies in the respective index. The rank is determined from the ranking lists mentioned in 2.2.

| Index            | R1               | R2 | R3              |
|------------------|------------------|----|-----------------|
| LPX50            | 60               | 50 | 25              |
| LPX Major Market | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |
| LPX Buyout       | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |
| LPX Composite    | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |
| LPX Europe       | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |
| LPX America      | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |
| LPX Venture      | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |
| LPX Direct       | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |
| LPX FoF          | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |
| LPX UK           | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |
| LPX Mezzanine    | $[n \times 1.2]$ | n  | $[\frac{n}{2}]$ |

**Table 4:** Ranking-Supported Adjustments

A constituent of the index that is ranked in the respective ranking list at R1 or worse is replaced, assuming a constituent exists, which is ranked at R2 or better in the ranking list. A non-index-constituent that is ranked at R3 or better in the respective ranking list is included in the index, if a company currently in the index has a lower rank than R2. Concerning the LPX Composite, the adjustment procedure is slightly different. All LPE companies that fulfil the liquidity ratios as given in Table 3 become constituents of the index since there is no maximal number of constituents. Consequently no ranking-supported adjustments occur in this case. At the end of the process of ordinary adjustments, there is a new constituent list for the respective index. At the same time, a new ranking list of possible successors is created. These ranking lists are created using the same method as those mentioned in Section 2.2, i.e., those companies (not currently in the index) with the highest market capitalisation or with the highest trading volume get the top rank and are therefore the first candidates to advance in in case of an ordinary adjustment (see Section 2.2). The integration of extraordinary adjustments into the calculation of the indices is explained in Section 4.2 of this Guide. Dealing with ordinary adjustments during the calculation of the indices is defined in Section 4.1 of this Guide.

<sup>5</sup> $[x]$  denotes the largest integer smaller than  $x$ .

### **Extraordinary Adjustment**

Adjustments due to extraordinary events will also be carried out:

**Constituent Replacement due to a Delisting** Constituents that have applied for a de-listing at an exchange or for whom bankruptcy proceedings have been adjudicated will be taken out of the index effective not later the day when the security is last traded at an exchange. In case the security is removed before that date, LPX Group will communicate the change in index composition in advance via appropriate channels. Specifically, the company with the highest rank of the successor list (see Section 2.2) will succeed in the index.

**Merger of Two Index Constituents** If an existing index constituent is acquired for eligible shares (or a combination of eligible shares and cash) by another index constituent, the existing constituent is deleted on the effective date of acquisition. The company with the highest rank of the successor list (see Section 2.2) will succeed in the index.

**Merger of an Index Constituent with a Non-Index Constituent** If an existing index constituent is acquired for eligible shares (or a combination of eligible shares and cash) by a quoted non-constituent, the merged company is continued in the index if eligible in all other respects of this Guide. If the requirements defined in Section 2.1 are not fulfilled, the merged company is replaced by the company with the highest rank of the successor list.

Dealing with extraordinary adjustments within the calculation of the indices is defined in Section 4.2 of this Guide. LPX Group reserves the right to deviate from the said rules for ordinary or extraordinary adjustment in exceptional cases.

**Spin-off** If an existing index constituent spins off a company, the spun-off company enters the index for a period of minimum 5 trading days. After that period the company will be removed from the index or, in case all criteria are met, will remain in the index.

### 3 Calculation Methods

#### 3.1 Index Formulae (Single Stock Distribution Reinvestment)

The calculation of the LPX indices follows the following formula:<sup>6</sup>

$$I_t^{TR} = K_t^{TR} \times \frac{\sum_{i=1}^{n_t} p_{i,t} \times w_{i,t} \times aa_{i,t} \times C_{i,t}^{TR}}{\sum_{i=1}^{n_0} p_{i,0} \times aa_{i,0} \times w_{i,0}} \times Basis_0^{TR} \quad (1)$$

$$I_t^{PI} = K_t^{PI} \times \frac{\sum_{i=1}^{n_t} p_{i,t} \times w_{i,t} \times aa_{i,t} \times C_{i,t}^{PI}}{\sum_{i=1}^{n_0} p_{i,0} \times aa_{i,0} \times w_{i,0}} \times Basis_0^{PI} \quad (2)$$

|                      |   |
|----------------------|---|
| $TR, PI$             | Total Return, Price Index                                 |
| $I_t^{TR}, I_t^{PI}$ | Index level (TR, PI)                                      |
| $K$                  | Index-specific chaining factor                            |
| $n$                  | Number of constituents in the index                       |
| $p$                  | Price in local currency                                   |
| $w$                  | Exchange rate   |
| $aa$                 | Capped number of shares (constant between chaining dates) |
| $C$                  | Current adjustment factor                                 |
| $Basis$              | Index-specific constant value                             |
| $t$                  | Index of time (daily)                                     |
| $i$                  | Index of index constituents                               |

<sup>6</sup>The formulae described in Section 3.1 apply to all LPX indices with the exception of the LPX Composite, which is calculated according the index calculation algorithm outlined in Section 3.2.

### 3.2 Index Formulae (Dividend Reinvestment across all Constituents)

The LPX Composite index follows a calculation formulae that assumes dividend reinvestment across all index constituents  $i$ . The index calculation formulae is given by

$$I_t^{TR} = I_{t-1}^{TR} \times \frac{\sum_{i=1}^{n_t} p_{i,t} \times w_{i,t} \times aa_{i,t} \times E_{i,t}}{\sum_{i=1}^{n_{t-1}} p_{i,t-1} \times aa_{i,t-1} \times w_{i,t-1} \times E_{i,t-1} - \sum_{j=1}^{d_t} DI_{j,t}^{TR} \times (1 - Q) \times aa_{j,t} \times w_{j,t} \times E_{j,t}} \quad (3)$$

$$I_t^{PI} = I_{t-1}^{PI} \times \frac{\sum_{i=1}^{n_t} p_{i,t} \times w_{i,t} \times aa_{i,t} \times E_{i,t}}{\sum_{i=1}^{n_{t-1}} p_{i,t-1} \times aa_{i,t-1} \times w_{i,t-1} \times E_{i,t-1} - \sum_{j=1}^{d_t} DI_{j,t}^{PI} \times (1 - Q) \times aa_{j,t} \times w_{j,t} \times E_{j,t}} \quad (4)$$

|                      |   |
|----------------------|---|
| $TR, PI$             | Total Return, Price Index   |
| $I_t^{TR}, I_t^{PI}$ | Index level (TR, PI)  |
| $d$                  | Number of constituents that go ex dividend  |
| $DI^{TR}$            | Cash dividends and special distributions  |
| $DI^{PI}$            | Cash dividends and special distributions excluding regular dividends  |
| $E$                  | Current adjustment factor (see formula 7)   |
| $j$                  | index $j = 1, 2 \dots, d$ denotes the companies that go ex dividend   |
| $Q$                  | Denotes flat withholding tax of 25 %  |
|                      | Deviations: For the LPX Direct Index, Q denotes a flat withholding tax of 15 %, except for US incorporated instruments, where $Q = 0$ |

### 3.3 Cap

One week before each chaining date, the weight of any constituent (i.e., the number of shares  $aa_i$ ) is determined in such a way that "Current CAP" holds for every index constituent, as defined in Table 1. Between each chaining date, which occurs semi-annually or quarterly, depending on the respective index,  $aa_i$  remains constant. This methodology is applied to all LPX index series except for the LPX Direct index, which is treated in accordance to the methodology as described in Section 3.4. The chaining dates are outlined in Table 1.

### 3.4 Free-float adjusted Cap

For the LPX Direct index an extended capping methodology applies. For each ordinary chaining, which is conducted on a quarterly basis, the "Free Float factor" for each index constituent security is determined based on publicly available information. The free-float adjusted market capitalization is determined for each index constituent security and ranked in descending order. In case that the sum of weights of the index constituents that show a weight greater than 4.8% exceeds 45% (hereinafter referred to as "Limit"), the weight of the first stock, which causes the breach of the Limit, is capped to 4.5%. This process is conducted iteratively until the Limit holds. The excess of the free-float adjusted market capitalization of the capped index constituents is allocated value-weighted to the remaining stocks of the index, which show an index weight smaller than 4.5%. In case this reallocation process leads to a weight greater than 4.5% for a constituent security (i.e., the first stock that is not capped to 4.5%), the stock is capped to 4.5% until the Limit holds and none uncapped stock after reallocation shows a weight greater than 4.5%.

### 3.5 Corporate Actions

For the calculation of the LPX indices the following corporate actions are taken into account. Specifically, the adjustment factors are defined for both price (PI) and total return (TR) index. The following formulae is applied for the adjustment factors:

$$C_{i,t}^{TR} = a_{i,t}^{TR} \times b_{i,t}^{TR} \times e_{i,t}^{TR} \times f_{i,t}^{TR} \quad (5)$$

$$C_{i,t}^{PI} = a_{i,t}^{PI} \times b_{i,t}^{PI} \times e_{i,t}^{PI} \times f_{i,t}^{PI} \quad (6)$$

$$E_{i,t} = b_{i,t}^{PI} \times e_{i,t}^{PI} \times f_{i,t}^{PI} \quad (7)$$

where the auxiliary factors  $a, b, e, f$ , for both the price (PI) and total return (TR) version are defined in the following paragraphs.

#### Cash Dividends and Special Distributions

Cash dividends include regular dividends (denoted by and expressed per share on the ex date), as well special cash dividends. Other special distributions include bonus shares from another company as well as spin-offs (denoted by SD and expressed per share on the ex date). For the TR indices all cash dividends and special distributions are included in the calculation. The following formulae apply to the auxiliary factor  $a$ :

$$a_{i,t}^{TR} = \begin{cases} 1, & \text{if } t = 1 \\ a_{i,t-1}^{TR} & \text{if } t \neq k, D_{i,t} = 0, SD_{i,t} = 0 \\ \left(1 + \frac{(1-Q)D_{i,t}}{p_{i,t-1} - (1-Q)D_{i,t}}\right) \times a_{i,t-1}^{TR} \text{ or } \left(1 + \frac{(1-Q)SD_{i,t}}{p_{i,t-1} - (1-Q)SD_{i,t}}\right) \times a_{i,t-1}^{TR}, & \text{if } t \neq k, D_{i,t} \neq 0 \text{ or } SD_{i,t} \neq 0 \end{cases} \quad (8)$$

$$a_{i,t}^{PI} = \begin{cases} 1, & \text{if } t = 1 \\ a_{i,t-1}^{PI} & \text{if } t \neq k, SD_{i,t} = 0 \\ \left(1 + \frac{(1-Q)SD_{i,t}}{p_{i,t-1} - (1-Q)SD_{i,t}}\right) \times a_{i,t-1}^{PI} \text{ or } \left(1 + \frac{(1-Q)SD_{i,t}}{p_{i,t-1} - (1-Q)SD_{i,t}}\right) \times a_{i,t-1}^{TR}, & \text{if } t \neq k, SD_{i,t} \neq 0 \end{cases} \quad (9)$$

with

$k$  Index of chaining dates

#### Stock Splits and Reverse Splits

This section does not only include stock splits, but also reverse splits (stock consolidation). The split ratio is denoted by  $SPR$  on the ex date. The auxiliary adjustment factor  $b$  is calculated according to the following formulae

$$b_{i,t}^{TR} = \begin{cases} 1, & \text{if } t = 1 \\ b_{i,t-1}^{TR} & \text{if } t \neq k, SPR_{i,t} = 1 \\ SPR_{i,t} \times b_{i,t-1}^{TR} & \text{if } t \neq k, SPR_{i,t} \neq 0 \end{cases} \quad (10)$$

$$b_{i,t}^{PI} = b_{i,t}^{TR} \text{ for all } i,t \quad (11)$$

### Bonus Shares of the same Company

Bonus shares from the same company are treated equivalently as a stock split. The variable  $B$  denotes the number of bonus shares per share held on the ex date. The auxiliary adjustment factor  $b$  is calculated according to the following formulae

$$e_{i,t}^{TR} = \begin{cases} 1, & \text{if } t = k \\ e_{i,t-1}^{TR} & \text{if } t \neq k, B_{i,t} = 0 \\ (1 + B_{i,t}) \times e_{i,t-1}^{TR} & \text{if } t \neq k, B_{i,t} \neq 0 \end{cases} \quad (12)$$

$$e_{i,t}^{PI} = e_{i,t}^{TR} \text{ for all } i,t \quad (13)$$

### Subscription Rights

Subscription rights are not taken into account by LPX Group until the ex date, where the value of the subscription rights is reinvested in the company according to the subscription rate ratio  $SRR$  leading to the same amount of invested capital than before the transaction. The auxiliary adjustment factor  $f$  is calculated according to the following formulae

$$f_{i,t}^{TR} = \begin{cases} 1, & \text{if } t = k \\ f_{i,t-1}^{TR} & \text{if } t \neq k, SRR_{i,t} = 1 \\ SRR_{i,t} \times f_{i,t-1}^{TR} & \text{if } t \neq k, SRR_{i,t} \neq 0 \end{cases} \quad (14)$$

$$f_{i,t}^{PI} = f_{i,t}^{TR} \text{ for all } i,t \quad (15)$$

An representative example is presented below:

|  | Formulae                                    | Constituent |
|--|---|-------------|
| Shares to be issued                                | (1)   | 1000        |
| Old number of shares                               | (2)   | 3000        |
| Share price <sub>t-1</sub>                         | (3)   | 100         |
| Issue price of new shares                          | (4)   | 80          |
| Subscription ratio                                 | (5)   | 3           |
| Expected share price after the issue               | (6) = [(1) × (4) + (2) × (3)] ÷ [(1) + (2)] | 95          |
| Value of subscription right (share price dilution) | (7) = [(3) - (6)]                           | 5           |
| Number of shares in the index                      | (8)   | 3000        |
| Value of subscription rights                       | (9) = [(7) × (8)]                           | 15000       |
| Number of additional shares                        | (10) = [(9) ÷ (6)]                          | 157.89      |
| Correction factor                                  | (11) = [(10) + (8)] ÷ (8)                   | 1.052632    |

**Table 5:** Example: Subscription Rights

### Other Corporate Actions

Any corporate actions, which have not been outlined in the aforementioned sections, but which will be taken into account for the calculation of the LPX index series, are communicated in advance via appropriate channels.



## 4 Chaining

An overview on the ordinary chaining dates of the LPX index series is provided in Table 1.

### 4.1 Ordinary Chaining

On every calculation day, LPX Group determines a chaining factor. The index-specific chaining factor  $K$  is calculated as follows:

$$K_t^{TR} = \begin{cases} 1, & \text{if } t = 0 \\ \frac{TRIndex}{ZW_{t=j}} & \text{if } t = j + 1 \\ K_{t-1}^{TR} & \text{if } t \neq j + 1, t \neq 0 \end{cases} \quad (16)$$

$$K_t^{PI} = \begin{cases} 1, & \text{if } t = 0 \\ \frac{PIIndex}{ZW_{t=j}} & \text{if } t = j + 1 \\ K_{t-1}^{PI} & \text{if } t \neq j + 1, t \neq 0 \end{cases} \quad (17)$$

Thereby, the index is calculated with the old index composition at a chaining date, while the intermediate value  $ZW$  is calculated with the new index composition. The intermediate value is calculated as follows:

$$ZW_{t=j}^{TR} = \frac{\sum_{i=1}^{n_t} p_{i,t} \times w_{i,t} \times aa_{i,t}}{\sum_{i=1}^{n_t} p_{i,0} \times w_{i,0} \times aa_{i,0}} \times Basis_0^{TR} \quad (18)$$

$$ZW_{t=j}^{PI} = \frac{\sum_{i=1}^{n_t} p_{i,t} \times w_{i,t} \times aa_{i,t}}{\sum_{i=1}^{n_t} p_{i,0} \times w_{i,0} \times aa_{i,0}} \times Basis_0^{PI} \quad (19)$$

### 4.2 Extraordinary Chaining

In case of an extraordinary adjustment, as defined in Section 2.2, LPX Group applies the following procedure:

#### Constituent Replacement due to a Delisting

The amount currently invested in the index of company  $i$  being replaced is completely shifted to successor  $j$ . In this general case, no chaining takes place since only a transfer of invested capital occurs. In case a constituent with a high weight is replaced by a successor with a high potential weight, there can be a deviation from this practice, whereby an adjustment of the weights of all index constituents takes place, meaning an analogous procedure to an ordinary chaining. Before each replacement LPX Group will communicate which of the two procedures are applied.

#### Merger of two Index Constituents

A new company (successor) must be included in the index due to the merger of two index constituents. This new inclusion requires an adjustment of the weights of all index constituents or an extraordinary chaining.

**Merger of an Index Constituent with a Non-index Constituent**

The capital invested in the index from the acquiring company remains unchanged. At the next regular chaining date, the number of shares will be adjusted. If the stock is not created by the retention of the listing of one of the old companies, the new company will be included in the index, whereby the invested capital of the company already represented in the index will be transferred. The number of shares will not be adjusted until the next regular chaining date. In the event the business purpose of a company after the merger no longer represents the definition of a LPE vehicle (described in Section 2.1), a replacement and an extraordinary chaining is applied.

**5 Amendments**

The Guide will be checked revised on a regularly basis by LPX Group. Moreover, the index calculation is monitored by an index committee, which ensures that the composition and calculation of the LPX index family are objective and transparent.

## 6 Data Vendor Codes

The LPX index family is disseminated via major data vendors. An overview on the various data vendor codes is depicted in the following table.

| <b>Total Return TR</b> |            |                      |                 |                              |                     |                   |                      |
|------------------------|------------|----------------------|-----------------|------------------------------|---------------------|-------------------|----------------------|
| <b>Name</b>            | <b>CCY</b> | <b>Base Date</b>     | <b>Valor CH</b> | <b>ISIN</b>                  | <b>Bloomberg</b>    | <b>Datastream</b> | <b>Reuters</b>       |
| LPX Composite          | EUR        | 31.12.01             | CH2561635       | CH0025616357                 | LPXCMPTR            | LPXCOME           | .LPXCMTR             |
| LPX50                  | EUR<br>USD | 31.12.93<br>31.12.93 | CH2273754       | CH0022737545<br>DE000SLA0PN4 | LPX50TR<br>LPX50TU  | LPX50IE           | .LPX50TR             |
| LPX Major Market       | EUR        | 31.12.97             | CH2223370       | CH0022233701                 | LPXMMITR            | LPXMAME           | .LPXMMTR             |
| LPX Buyout             | EUR        | 31.12.93             | CH2602948       | CH0026029485                 | LPXABOTR            | LPXBUYE           | .LPXBOTR             |
| LPX Mezzanine          | EUR        | 31.12.03             | CH3064813       | CH0030648130                 | LPXMEZTR            | LPXMEZE           | .LPXMZTR             |
| LPX Venture            | EUR        | 31.12.93             | CH2614410       | CH0026144102                 | LPXVENTR            | LPXVENE           | .LPXVETR             |
| LPX Direct             | EUR<br>USD | 31.12.98<br>31.12.98 | CH3630400       | CH0036304001<br>DE000SLA4DT9 | LPXIDITR<br>LPXDITU | LPXDIRE           | .LPXDITR<br>.LPXDITU |
| LPX Direct US          | USD        | 31.12.98             | n/a             | DE000SLA4DT9                 | LPXDITU             | n/a               | .LPXDITU             |
| LPX FoF                | EUR        | 31.12.99             | CH2614436       | CH0026144367                 | LPXINDTR            | LPXINDE           | .LPXINTR             |
| LPX America            | EUR        | 31.12.97             | CH2614430       | CH0026144300                 | LPXAMETR            | LPXAMRE           | .LPXAMTR             |
| LPX Europe             | EUR        | 31.12.93             | CH2614420       | CH0026144201                 | LPXEURTR            | LPXEURE           | .LPXEUTR             |
| LPX UK                 | EUR        | 31.12.98             | CH3064811       | CH0030648114                 | LPXUKTR             | LPXUKIE           | .LPXUKTR             |
| <b>Price Index PI</b>  |            |                      |                 |                              |                     |                   |                      |
| LPX Composite          | EUR        | 31.12.01             | CH2561655       | CH0025616555                 | LPXCMPPI            | LPXCOME           | .LPXCMPI             |
| LPX50                  | EUR<br>USD | 31.12.93<br>31.12.93 | CH2390630       | CH0023906305<br>DE000LSA1PN2 | LPX50PI<br>LPX50PU  | LPX50IE           | .LPX50PI             |
| LPX Major Market       | EUR        | 31.12.97             | CH2354257       | CH0023542571                 | LPXMMIPI            | LPXMAME           | .LPXMMPI             |
| LPX Buyout             | EUR        | 31.12.93             | CH2602950       | CH0026029501                 | LPXABOPI            | LPXBUYE           | .LPXBOPI             |
| LPX Mezzanine          | EUR        | 31.12.03             | CH3064823       | CH0030648239                 | LPXMEZPI            | LPXMEZE           | .LPXMZPI             |
| LPX Venture            | EUR        | 31.12.93             | CH2614412       | CH0026144128                 | LPXVENPI            | LPXVENE           | .LPXVEPI             |
| LPX Direct             | EUR        | 31.12.98             | CH3630412       | CH0036304126                 | LPXIDIPI            | LPXDIRE           | .LPXDIPI             |
| LPX Direct US          | USD        | 31.12.98             | CH3630412       | DE000SLA4DP7                 | LPXDIPU             | n/a               | .LPXDIPU             |
| LPX FoF                | EUR        | 31.12.99             | CH2614451       | CH0026144516                 | LPXINDPI            | LPXINDE           | .LPXINPI             |
| LPX America            | EUR        | 31.12.97             | CH2614432       | CH0026144326                 | LPXAMEPI            | LPXAMRE           | .LPXAMPI             |
| LPX Europe             | EUR        | 31.12.93             | CH2614423       | CH0026144235                 | LPXEURPI            | LPXEURE           | .LPXEUPI             |
| LPX UK                 | EUR        | 31.12.98             | CH3064820       | CH0030648205                 | LPXUKPI             | LPXUKIE           | .LPXUKPI             |

Table 6: Data Vendor Codes

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