

# Guide to the Strategy Indices of Deutsche Börse AG

Version 2.26

August 2017

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## General Information

In order to ensure the highest quality of each of its indices, Deutsche Börse AG exercises the greatest care when compiling and calculating indices on the basis of the rules set out in this Guideline.

However, Deutsche Börse AG cannot guarantee that the various indices, or the various ratios that are required for index compilation and computation purposes, as set out in this Guideline, are always calculated free of errors. Deutsche Börse AG accepts no liability for any direct or indirect losses arising from any incorrect calculation of such indices or ratios.

Decisions concerning the way its indices are calculated, as well as regarding their compilation, are always taken by Deutsche Börse AG to the best of its knowledge and belief Deutsche Börse AG monitors the execution of the index calculation rules in order to ensure the validity of the index methodology on an annual basis. Furthermore, Deutsche Börse AG may also decide to undertake a broad market consultation. Once a decision on a significant index methodology change is made, a notification will be issued for public comment with a reasonable notice period. Deutsche Börse AG shall not be liable for any losses incurred after such decisions are made.

The indices of Deutsche Börse AG in no way represent a recommendation for investment. In particular, the compilation and calculation of the various indices shall not be construed as a recommendation of Deutsche Börse AG to buy or sell individual instruments, or the basket of instruments underlying a given index.

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## History of Amendments to the Rules and Regulations

03 August 2017	Version 2.26	Launch of idDAX 50 Equal Weight and idDAX 50 Equal Weight Decrement 4.00%
20 March 2017	Version 2.25	Change of data provider for shareholder structures of DAXplus Family Indices
25 April 2016	Version 2.24	Edit of wording for the index-specific deviation threshold from one index tick to another Correction of date when calculation of DAX <sup>®</sup> was starting to use Xetra <sup>®</sup> prices
08 September 2015	Version 2.23	Launch of DAXplus 30 Decrement 40
02. June 2015	Version 2.21	Change of Trigger Level for Reverse Split for Leverage and Short Indices
08. May 2015	Version 2.21	Launch of monthly currency hedged indices
09. April 2015	Version 2.20	Launch of LevDAX x9, LevDAX x10, ShortDAX x9 and ShortDAX x10
23. Mar. 2015	Version 2.19	Change of review frequency for DAXplus Family Indices
17. Feb. 2015	Version 2.18	Change to selection and capping rules of DAXplus Maximum Dividend
22. Dec. 2014	Version 2.17	Clarification of the rulebook according to IOSCO principles
28. Aug. 2014	Version 2.16	Launch of ShortMDAX
20 Aug. 2014	Version 2.15	Launch of HDAX Hedged
27 Jan 2014	Version 2.14	Adjustment of 3.3.3– daily leverage and short indices
25 Oct. 2013	Version 2.13	Adjustment of extraordinary Replacement rule in DAXplus Maximum Dividend Index
16 Aug. 2013	Version 2.12	Update of contact details (appendix)
25 July. 2013	Version 2.11	Adjustments due to extreme market movements
25 Feb. 2013	Version 2.9	Rule adjustments Daily Leverage and Daily Short Indices Description of price-relevant capital changes in chapter 4
26 Nov 2012	Version 2.9	Rule adjustments LevDAX x3 and ShortDAX x3 Indices
23 July 2012	Version 2.7	Launch of additional LevDAX and ShortDAX Indices
July 2011	Version 2.6	Launch of DAXplus Minimum Variance / Maximum Sharpe Ratio Net Return Indices

16 May 2011	Version 2.6	Launch of DivMSDAX
4 April 2011	Version 2.5	Launch of DAX <sup>®</sup> Risk Control Indices
9 Mar 2011	Version 2.4	Launch of LevDAX <sup>®</sup> Optimal
17 Jan 2011	Version 2.3	Launch of ShortTecDAX
17 Dec 2010	Version 2.2	Consideration of cost of borrow in Short Indices
27 Sep 2010	Version 2.1	Launch of LevDAX <sup>®</sup> x2 Monthly, ShortDAX <sup>®</sup> x2 Monthly
4 Jan 2010	Version 2.0	Introduction DAXplus <sup>®</sup> Familiy Index
28 Aug. 2009	Version 1.19	Changed chaining date of DAXplus <sup>®</sup> Maximum Dividend
4 May 2009	Version 1.18	Launch of DAX <sup>®</sup> Dividend Points, DivDAX <sup>®</sup> Dividend Points
27 Apr. 2009	Version 1.17	Launch of DAXplus <sup>®</sup> Risk Trigger Germany
30 Mar. 2009	Version 1.16	Launch of LevDAX <sup>®</sup> x4, ShortDAX <sup>®</sup> x2, ShortDAX <sup>®</sup> x4
9 Mar. 2009	Version 1.15	Launch of DAXplus <sup>®</sup> Maximum Dividend
5 Feb. 2009	Version 1.14	Concretion of exception handling in DivDAX <sup>®</sup>
16 Dec. 2008	Version 1.13	Launch of DAXplus <sup>®</sup> Directors Dealings Germany
31 Mar. 2008	Version 1.12	International indices moved to "Guide to the international Strategy Indices of Deutsche Börse"
3 Sep. 2007	Version 1.11	Launch of DAXplus <sup>®</sup> Maximum Sharpe Ratio Japan (JPY), DAXplus <sup>®</sup> Minimum Variance Japan (JPY)
9 Jul. 2007	Version 1.10	Launch of DAXplus <sup>®</sup> Maximum Sharpe Ratio France, DAXplus <sup>®</sup> Maximum Sharpe Ratio Japan, DAXplus <sup>®</sup> Maximum Sharpe Ratio Switzerland, DAXplus <sup>®</sup> Maximum Sharpe Ratio US
9 Jul. 2007	Version 1.10	Launch of DAXplus <sup>®</sup> Minimum Variance France, DAXplus <sup>®</sup> Minimum Variance Japan, DAXplus <sup>®</sup> Minimum Variance Switzerland, DAXplus <sup>®</sup> Minimum Variance US
12 Jun. 2007	Version 1.9	Launch of DAXplus <sup>®</sup> Maximum Sharpe Ratio Germany
29 May 2007	Version 1.8	Launch of DAXplus <sup>®</sup> Minimum Variance Germany
27 Mar. 2007	Version 1.7	Launch of ShortDAX <sup>®</sup>
7 Aug. 2006	Version 1.6	Launch of DAXplus <sup>®</sup> Protective Put
28 Jun. 2006	Version 1.5	Launch of LevDAX <sup>®</sup>
6 Jun. 2006	Version 1.4	New Cap Limit for DAXplus <sup>®</sup> Seasonal Strategy
23 Jan. 2006	Version 1.3	Launch of DAXplus <sup>®</sup> Covered Call
24 Oct. 2005	Version 1.2	Launch of DAXplus <sup>®</sup> Export Strategy

13 Jun. 2005

Version 1.1 Launch of DAXplus® Seasonal Strategy

CDAX®, Classic All Share®, DAX®, DivDAX®, DAXplus®, FWB® Frankfurter Wertpapierbörse, HDAX®, MDAX®, LevDAX®, ShortDAX®, SDAX®, SMAX®, NEMAX50®, TecDAX®, Eurex®, Xetra® und XTF® Exchange Traded Funds are registered trademarks of Deutsche Börse AG.

## 1 General Index Information

Deutsche Börse calculates indices which enhance the transparency of the markets it operates, thus facilitating comparison.<sup>1</sup> At the same time, indices are increasingly used as underlying instruments for financial products such as futures, options, warrants, as well as funds. The existing index universe is now complemented by the introduction of additional strategy indices.

With the DAXplus® index family, Deutsche Börse has launched a range of strategy indices providing investors with transparent, rule-based, and low-cost tools to implement successful investment strategies.

### 1.1 DivDAX and DivMSDAX

Deutsche Börse's DivDAX® and DivMSDAX are constructed using dividend yield as a selection criterion. DivDAX contains the 15 companies with the highest dividend yield within the German blue chip index DAX®, DivMSDAX is based on the companies included in MDAX and SDAX.

### 1.2 DAXplus Seasonal Strategy

The DAXplus® Seasonal Strategy index is a German equity index calculated by Deutsche Börse. This special index concept allows for seasonal investment strategies by locking in the index level achieved during August and September – traditionally, lower index levels prevail during these months. The index comprises the 30 component issues of the blue chip DAX® index, and is calculated accordingly.

### 1.3 DAXplus Export Strategy

The DAXplus® Export Strategy index consists of strong exporting companies, who thus benefit from strong growth outside the German economy. The index comprises the ten

1) Cf. „Guide to the Equity Indices of Deutsche Börse“ for an overview of Selection- und All Share-indices.



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component issues from the DAX<sup>®</sup> and MDAX<sup>®</sup> indices with the highest proportion of exports in their revenues.

#### 1.4 DAXplus Covered Call

With the DAXplus<sup>®</sup> Covered Call index, Deutsche Börse reflects the so-called “covered call” option strategy. This strategy – which is also referred to as “buy-write” – involves the purchase of an underlying instrument and the simultaneous sale of a call option on that instrument.

The index is based on the DAX<sup>®</sup>-index and a (short) DAX call option traded at Eurex<sup>®</sup>.

#### 1.5 Leveraged and Short Indices

With leveraged indices Deutsche Börse calculates indices linked by the leverage effect (cf. chapter 3.3.2) to the movements of blue-chip index DAX<sup>®</sup>. A positive change of DAX will result in the corresponding leveraged performance of leveraged indices and vice versa.

With short indices Deutsche Börse calculates indices linked inversely to the movements of its underlying blue-chip index. A positive change of the underlying index will result in a negative change in short indices.

#### 1.6 DAXplus Protective Put

With the DAXplus<sup>®</sup> Protective Put index, Deutsche Börse reflects the Protective Put investment strategy, which provides protection from losses. This strategy combines an index investment with an options position. It involves buying a put option while simultaneously purchasing the option's underlying.

The index is based on the DAX<sup>®</sup>-index and a (long) DAX put option traded at Eurex<sup>®</sup>.

#### 1.7 DAXplus Minimum Variance Germany

The concept of DAXplus<sup>®</sup> Minimum Variance Germany is based on the portfolio analysis from capital market theory which allows the calculation of variance optimized weight for each of the DAX<sup>®</sup> constituents. On the basis of these weights DAXplus Minimum Variance Germany is calculated under risk minimizing aspects.

For information concerning international DAXplus Minimum Variance indices cf. “Guide to the international Strategy Indices of Deutsche Börse”.

#### 1.8 DAXplus Maximum Sharpe Ratio Germany

The concept of DAXplus<sup>®</sup> Maximum Sharpe Ratio Germany is based upon the portfolio analysis and takes into account the same capital market theoretical effects as DAXplus<sup>®</sup> Minimum Variance Germany. As a distinctive feature DAXplus Maximum Sharpe Ratio Germany not only focuses on minimization of risk but also on maximization of return. By maximizing the portfolios sharpe ratio a trade of between minimized volatility and maximized return shall be aspired (cp. chapter 3.4.1).

For information concerning international DAXplus Maximum Sharpe Ratio indices cf. “Guide to the international Strategy Indices of Deutsche Börse”.

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## 1.9 DAXplus Maximum Dividend

With DAXplus<sup>®</sup> Maximum Dividend Deutsche Börse<sup>®</sup> calculates a strategy index that aims to maximize the dividend yield of the index portfolio. The index comprises 20 shares from the HDAX index which have the highest expected dividend yield.

## 1.10 DAXplus Risk Trigger Germany

DAXplus<sup>®</sup> Risk Trigger Germany measures the performance of the DAX index, but limits the losses in bear markets by getting out in time when volatility is critical. In the meantime, the equity investment is exchanged for a risk-free money market investment with a low but guaranteed return. Reinvestment is possible again when the volatility in the markets is less high.

For information concerning international DAXplus Risk Trigger indices cf. "Guide to the international Strategy Indices of Deutsche Börse".

## 1.11 Dividend Points Indices

The indices DAX<sup>®</sup> Dividend Points and DivDAX<sup>®</sup> Dividend Points measure the dividend component of the underlying indices DAX and DivDAX. The Dividend Points indices reflect the absolute income of the portfolio and not the performance of the portfolio itself as conventional indices do. With these indices, it is possible to separate the dividend component and the resulting risk and hedge the dividend effect on short equity positions in DAX and DivDAX.

## 1.12 DAXplus Family

The DAXplus Family index measures the performance of founder dominated companies ("family enterprises") that are listed at the Frankfurt Stock Exchange (FWB<sup>®</sup>). The DAXplus Family Index was developed in cooperation with the Center for Entrepreneurial and Financial Studies (CEFS) at Technische Universität München (TUM). The continuous review of selection criteria is performed annually in March by Deutsche Börse based on shareholder structure information provided by Marketline.

## 1.13 DAX Risk Control Indices

A target volatility concept is applied to the DAX<sup>®</sup> (TR) Index. Whereas the risk profile of the DAX Index is the uncontrolled outcome of the existing market-cap weighted index concept, the Risk Control Indices control for risk by aiming at a target volatilities of 5% (10%, 15%, 20%). In order to control for risk, the index shifts between a risk free money market investment (measured via EONIA) and a risky part (measured by the DAX<sup>®</sup> Index).

## 1.14 Currency-Hedged Indices

The Deutsche Börse Hedged Indices are an innovative investment tool that measures the performance of the underlying index while at the same time eliminating foreign currency fluctuations. The currency-hedged indices eliminate the risk of the currency fluctuations at the cost of potential currency gains. Deutsche Börse AG offers two versions of currency-

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hedged indices: one that resets the hedge notional and the currency exposure on a daily basis and one that resets both on a monthly basis.

### **1.15 DAXplus 30 Decrement 40 Index**

The DAXplus 30 Decrement 40 index replicates the returns of an investment into the underlying index with a constant markdown expressed in index points, accruing on a daily basis.

While the DAXplus 30 Decrement 40 has lower returns than the underlying DAX (TR) by construction, it may perform better than the DAX (Pr) index, provided that the dividend points not reinvested in the DAX (Pr) exceed, on an equivalent annual basis, the decrement amount.

### **1.16 idDAX 50 Equal Weight Index**

The idDAX® 50 Equal Weight Index tracks the performance of the 50 largest and most liquid companies from the German stock market. It includes all stocks from the DAX® index (30) completed with the 20 most liquid companies from the Prime Standard segment.

### **1.17 idDAX 50 Equal Weight Decrement 4.00% Index**

The idDAX 50 Equal Weight Decrement 4.00% index replicates the performance of the idDAX 50 Equal Weight EUR index assuming a constant 4.00% performance deduction per annum. The performance deduction accrues constantly on a daily basis.

Consequently, due to the percentage of performance being subtracted, the decrement index is underperforming the standard net return index. The decrement index may perform better than the standard price index that does not consider dividend investments as long as the overall net dividend yield of the base index is greater than the value being subtracted.

The base index is the idDAX 50 Equal Weight Net Return EUR Index.

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## 2 Index Composition

The composition of strategy indices is based on the respective underlying trading strategy. Special characteristics are presented below.

### 2.1 DivDAX and DivMSDAX

DivDAX comprises those 15 companies with the highest dividend yield within the DAX<sup>®</sup> index, DivMSDAX those within the combined universe of MDAX and SDAX index. Moreover, the shares are required to show an average daily traded volume of 250,000€ over the past three months. Historical dividend yields are calculated by dividing distributed dividends by the closing price of the respective share on the day preceding the ex date.

The 15 DivDAX<sup>®</sup> and DivMSDAX component issues are re-determined each September. Hence, the index composition will generally change once a year. If an index member publicly announces that it will not pay dividends at the upcoming dividend date, it will be removed from the index at the next rebalancing date. It will be replaced by the next company on the ranking list, that has not ceased dividend payments itself. If no replacement exists, the company will be removed from the index without replacement. If there is no rebalancing date between the announcement and the previously planned payout date the change will be executed with two full trading days notice following the announcement.

The index weighting is based on the free float market capitalization<sup>2</sup>, whereby the maximum weighting per share is capped at 10 percent. This cap is designed to prevent individual shares from dominating the index.

All index members are also included in a blue-chip index, thus ensuring high liquidity.

Rebalancing takes place on a quarterly basis, in line with the methodology applied to DAX.

The base is 17 September 1999, with a base value of 100.

The indices are calculated both as a price and as a performance index. They are calculated every 15 seconds, using Xetra<sup>®</sup> price data for companies quoted in the Prime Standard segment.

### 2.2 DAXplus Seasonal Strategy

The index comprises the 30 component issues of the German blue-chip DAX<sup>®</sup> index.

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<sup>2)</sup> Cf. free float definition in „Guide to the Equity Indices of Deutsche Börse“.

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Similar to DivDAX<sup>®</sup>, the index weighting is based on the free float market capitalization, but with the maximum weighting per share capped at 10 percent<sup>3</sup>.

The base date of DAXplus<sup>®</sup> Seasonal Strategy is 30 December 1987, with a base level of 1000.

Chaining takes place on a quarterly basis, in line with the methodology applied to the DAX.

The special feature of DAXplus Seasonal Strategy index is that the index value is frozen on the last trading day in July, and is not changed until the last trading day in September. The period between is referred to as the 'de-investment phase'. Starting with the first trading day in October, the index will again be calculated on the basis of the then current DAX composition.

Outside the de-investment phase during August and September, the index is calculated every 15 seconds, using Xetra<sup>®</sup> price data for companies quoted in the Prime Standard segment. DAXplus Seasonal Strategy is calculated both as a price and as a performance index.

### 2.3 DAXplus Export Strategy

The index composition is updated once a year, on the chaining date in September. Ten component issues of the DAX<sup>®</sup> and MDAX<sup>®</sup> indices are chosen, selecting those companies that, within each index, have derived the highest proportion of their revenues outside Germany (based on figures disclosed in their annual reports for the preceding business year). The Banks and Financial Services sectors are not considered for this index.

Similar to DivDAX<sup>®</sup>, the index weighting is based on the free-float market capitalization, with the maximum weighting per share also capped at 10 percent. The outcome of this is the equal weighting of all index constituents.

The base date of DAXplus<sup>®</sup> Export Strategy is 18 March 2002, with a base level of 100.

DAXplus Export Strategy is calculated both as a price and as a performance index. The price index is calculated every 15 seconds and the performance index end of day, using Xetra<sup>®</sup> price data for companies quoted in the Prime Standard segment.

### 2.4 DAXplus Covered Call

DAXplus<sup>®</sup> Covered Call index combines the DAX<sup>®</sup> index and a DAX call option.

The base date of DAXplus Covered Call is the 31 December 1992, with a base level of 100.

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<sup>3</sup>) As of the chaining day in September 2006 the cap limit of DAXplus Seasonal Strategy was lowered to 10 percent.

The index composition is adjusted on a monthly basis. On each third Friday of the month, a new front-month call option is determined, which will be used to calculate the index until their last trading day, at 1.00 p.m. CET.

On normal trading days, the DAXplus Covered Call index is calculated every 60 seconds, between 9.00 a.m. and 5.45 p.m. CET; on option rollover dates, only from 9.00 a.m. to 1.00 p.m. CET. The calculation is based on Xetra<sup>®</sup> and Eurex<sup>®</sup> price data.

## 2.5 Leveraged and Short Indices

Leveraged indices are linked to the changes of blue-chip index DAX<sup>®</sup>, applying a positive leverage factor to DAX movements. Therefore, investing in leveraged indices yields x-fold the performance of DAX, compared to the closing level from the last day of calculation. Short Indices are linked to the inverse movement of blue-chip index DAX<sup>®</sup> (TecDAX<sup>®</sup>).

The adjustment of leverage takes place daily or (in case of monthly adjustment) on each third Friday of a month.

The base date of the leveraged indices is 30 December 1987, with a base value of 1,000, analogous to DAX index. The base date of the short indices is 29 December 2006, with a base value of 6,596.92, analogous to the closing value of the DAX index (748,32 analogous to the closing value of the TecDAX index) on that day.

The leveraged and short indices based on underlying which are calculated real time, are also calculated in real time every 15 seconds between 9.00 a.m. and 5.45 p.m. based on DAX (TecDAX) (performance index).

## 2.6 DAXplus Protective Put

The DAXplus<sup>®</sup> Protective Put index combines the DAX<sup>®</sup> index and a DAX put option.

The base date of DAXplus Protective Put is 31 December 1992, with a base level of 100.

The index composition is adjusted on a quarterly basis. On third Friday in March, June, September and December, a new put option is determined, which will be used to calculate the index until the last trading day, at 1.00 p.m. CET for the following three months.

On normal trading days, the DAXplus Protective Put index is calculated every 60 seconds, between 9.00 a.m. and 5.45 p.m. CET; on option rollover dates, only from 9.00 a.m. to 1.00 p.m. CET. The calculation is based on Xetra<sup>®</sup> and Eurex<sup>®</sup> price data. The calculation and dissemination of the LevDAX x3 and ShortDAX x3 indices that are calculated realtime starts at 09:05 a.m. CET.

## 2.7 DAXplus Minimum Variance Germany

DAXplus<sup>®</sup> Minimum Variance Germany reflects the DAX<sup>®</sup> portfolio with the optimized weight for each of the DAX constituents in consideration of the portfolio theory model. Taking into account the correlation and the volatility of the single DAX values, DAXplus

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Minimum Variance Germany represents an optimal solution under risk minimizing aspects.

The base date of DAXplus Minimum Variance Germany is the 21 September 2001, with a base level of 100.

The chaining takes place on a quarterly basis (i.e. on the third Friday of the last month of a quarter). Therefore, the optimal weights are recalculated as described in chapter 3.4.1. In this context, it can occur that some of the weights are determined with 0.00 percent. Accordingly, these constituents are not considered in the index. For the variance calculation of the DAX constituents the continuous day's yield over the last twelve months is used (cf. chapter 3.4.1). The date, as of the continuous yield over the last twelve months is considered, is also actualized quarterly as it depends on the chaining date. Between two chaining dates the weighting factors  $q_{i,T}$  which are derived out of the weight (cf. chapter 3.4.2) are kept constant.

DAXplus Minimum Variance Germany is calculated as performance and price index in real time every 15 seconds, between 9.00 a.m. and 5.45 p.m. CET in Euro, US-Dollar and British Pound. The calculation is based on Xetra<sup>®</sup> price data.

## 2.8 DAXplus Maximum Sharpe Ratio Germany

DAXplus<sup>®</sup> Maximum Sharpe Ratio Germany is based on the portfolio of the DAX<sup>®</sup>-Index, but also utilizes the possibility to optimize the weights analogous to DAXplus<sup>®</sup> Minimum Variance Germany. In contrast to DAXplus Minimum Variance Germany the objective function is augmented to take into account return as well as risk of the portfolio. This approach aims to realize an optimal risk-return ratio.

The base date of DAXplus Maximum Sharpe Ratio Germany is the 21 September 2001, with a base level of 100.

The chaining takes place on a quarterly basis (i.e. on the third Friday of the last month of a quarter). The weightings are calculated in line with the methodology applied to DAXplus Minimum Variance Germany (cp. chapters 2.7 and 3.4.1). Between two chaining dates the weighting factors  $q_{i,T}$  which are derived out of the weight (cp. chapter 3.4.2) are kept constant.

DAXplus Maximum Sharpe Ratio Germany is calculated as performance and price index in real time every 15 seconds, between 9.00 a.m. and 5.45 p.m. CET in Euro, US-Dollar and British Pound. The calculation is based on Xetra<sup>®</sup> price data.

## 2.9 DAXplus Maximum Dividend

The index consists of the 20 companies in the HDAX Index, which have the highest expected dividend yield and will pay a dividend within the forthcoming adjustment period. The expected dividend yield will be determined by the announced and the estimated dividend amount and the closing price of the stock at the time of selection.

The composition of the index is reviewed twice a year at the end of April and October and becomes effective on 2nd Friday in May and November after the close of trading (in case that an extraordinary adjustment of the index composition is required, it will become effective on the 2nd Friday of the month). Those HDAX<sup>®</sup> companies are considered which will pay a dividend within the upcoming six months. In addition companies need to belong to the 75% largest companies in terms of Market Cap and to the 65% most liquid companies in terms of 3 month average-daily-trading-volume in HDAX<sup>®</sup>. This ensures a high liquidity of the index. If less than 20 companies meet the above named criteria, the index portfolio will be supplemented by the best companies (in terms of the dividend yield) of the previous period.

If a member of the DAXplus Maximum Dividend index leaves the HDAX index or publicly announces that it will not pay a dividend, it will be replaced by the next company on the most recent ranking list that neither has cancelled his distribution, will pay a dividend until the next regular rebalancing and meets the additional index criteria. If no replacement candidate exists, no action will be taken.

The index weighting is based on the expected dividend yield: the higher the dividend yield of a company, the higher its weight in the index portfolio. The maximum weight of a company is subject to a double capping mechanism, where in a first step the maximum weight is capped to 10 percent. In addition a liquidity test is conducted based on an artificial portfolio size of EUR 300 mio. A component has passed the test if the amount newly invested does not exceed 2.5-times the liquidity of the company. This prevents that single issues dominate the index.

The base date of DAXplus<sup>®</sup> Maximum Dividend Index is 21 May 1999 with an index level of 100.

DAXplus Maximum Dividend is calculated as price and performance index. The calculation is performed every 15 seconds on the basis of Xetra prices.

## 2.10 DAXplus Risk Trigger Germany

The index concept of DAXplus<sup>®</sup> Risk Trigger Germany is based on the premise that share price increases generally happen slowly and steadily, i.e. with low volatility, whereas decreases mostly happen very quickly, displaying a much higher volatility. High volatility is equated to a high level of risk. If the DAX<sup>®</sup> index underlying DAXplus Risk Trigger Germany exceeds a certain defined threshold, the investment is reallocated in its entirety to the money market (eb.rexx Money Market Index).

Reinvestment in the equity portfolio will not take place until the volatility level has fallen below a defined lower limit and the market phase is no longer deemed to be risky. The short-term 10-day volatility level of the underlying index forms the basis of this decision. The definition of the relevant volatility limits is based on the long term average volatility of the DAX index (DAXplus Risk Trigger Germany: 20%/30%).

The base date of DAXplus Risk Trigger Germany is the 30 December 1987, with a base level of 1,000.



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## 2.11 Dividend Points Indices

DAX® Dividend Points and DivDAX® Dividend points reflect the income resulting from regular dividends and bonus payments of the companies included in the respective underlying index. These distributions are accumulated for the entire index portfolio and hence measure the income of the current year in index points. The Dividend Points indices are reset to zero on the regular chaining date of the underlying indices in December.

The indices are calculated and published once a day.

## 2.12 DAXplus Family

The DAXplus Family index is an all-share index that comprises all companies listed in the Prime Standard segment at the Frankfurt Stock Exchange and meet the specific selection criteria for family enterprises. Family enterprises are characterized – according to the understanding applied here – by the following two attributes:

- **Family Ownership**

The group of index relevant people is a major shareholder of the company, i.e. it holds at least 25 percent of all ordinary shares

and/or

- **Family Management**

The group of index relevant people holds at least 5 percent of the ordinary shares and is member of the company management (management or supervisory board).

The group of index relevant people consists of founders (both single founders and teams of founders) of the company and their families.

In a broader sense the group of index relevant people is also assigned such shares that are being held indirectly by an asset management, investment or holding company, in case these are owned or controlled by the group of index relevant people.

In addition, with the DAXplus Family 30 index a liquid selection index is being calculated that comprises the 30 largest family enterprises (according to free float market capitalization) which have an average daily trading volume of at least €500,000 over the preceding three months at the time of index review.

The base date of the DAXplus Family indices is 21 June 2002 with a base value of 1000.

The composition of the index is reviewed on an annual basis in March. The index weighting is based on the free float market capitalization of the shares. The weight of an underlying is limited to a maximum of 10 percent.

The DAXplus Family indices are calculated continuously every 60 seconds from 9 a.m. to 5:45 p.m. as total return index, the price indices are computed once a day at market close. The calculation is based on Xetra® prices.

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## 2.13 DAX Risk Control Indices

In order to control for risk, the index shifts between a risk free money market investment (measured via EONIA) and a risky part (measured by the DAX<sup>®</sup> Index). The asset allocation is reviewed on a daily basis.

If on a daily basis the risk of the current DAX Risk Control Index composition is below the targeted risk of 5% (10%, 15%, 20%), the allocation will be adjusted towards the risky asset, in case the current risk profile is above the targeted 5% (10%, 15%, 20%), the allocation will be adjusted towards the risk free component (EONIA).

To avoid extreme leveraged positions, a maximum exposure of 150% towards the risky asset is introduced. Furthermore, a tolerance level of 5% around the target weight is implemented to avoid high allocation turnover due to minimal deviations from the targeted risk.

## 2.14 Currency-Hedged Indices

The Deutsche Börse currency-hedged indices combine an investment in the underlying, unhedged index with a short position in currency forwards: profits (losses) deriving from the appreciation (depreciation) of the foreign denomination currency of the constituents are offset by losses (profits) from the currency forward hedge.

For monthly hedged indices, the total hedge amount and the allocation to the individual underlying currencies (where applicable) is reset at the end of the month; for daily hedged indices, the adjustments occur every day.

## 2.15 idDAX 50 Equal Weight Index

The idDAX 50 Equal Weight Index uses the compositions of the DAX index and completes it with the 20 companies with highest turnover from the Prime Standard segment as reported in the DAX Selection Indices ranking list.

The sum of the turnover determined on the FWB Frankfurt Stock Exchange for the respective share classes of a company is defined as the order book volume. The reporting date for collecting data is the last trading day of the month for which the ranking list is created. The ranking list is created and published monthly by Deutsche Börse AG. For more information about the DAX Selection indices, please consult Section 4 of the Guide to the Equity Indices of Deutsche Börse AG.

All components are equally weighted. Between two chaining dates the weighting factors  $q_iT$  which are derived out of the weight (cp. Chapter 3.4.2) are kept constant.

The base date of idDAX 50 Equal Weight is the 21 March 2005, with a base level of 100.

Chaining takes place on a quarterly basis, in line with the methodology applied to the DAX.

The idDAX 50 Equal Weight index is calculated as performance (net and gross return) and price index in real time every 1 seconds, between 9.00 a.m. and 5.45 p.m. CET in Euro. The calculation is by default based on Xetra price data; if those are missing then FRA data are used.

The idDAX 50 Equal Weight index is subject to Extraordinary Index Review as any other Selection Index as described in section 5 of the Guide to the Equity Indices of Deutsche Börse AG. A deleted company is replaced by the highest turnover company from the last ranking list.

### 3 Calculation

The calculation of the indices described in this document is based on several formula defined in the following. The adjustment of price-relevant capital changes as well as the calculation of implied changes in the correction factor  $c_{it}$  are generally described in chapter 4.

#### 3.1 DivDAX, DivMSDAX, DAXplus Seasonal Strategy and DAXplus Export Strategy

##### 3.1.1 Index Formula

Deutsche Börse's indices are conceived according to the Laspeyres formula set out below:

##### A. DivDAX<sup>®</sup> and DAXplus<sup>®</sup> Export Strategy

$$\text{Index}_t = K_T \cdot \frac{\sum_{i=1}^n p_{it} \cdot q_{iT} \cdot ff_{iT} \cdot c_{it}}{\sum_{i=1}^n p_{i0} \cdot q_{i0}} \cdot \text{Base}$$

##### B. DAXplus<sup>®</sup> Seasonal Strategy

$$\text{Index}_t = \begin{cases} K_T \cdot \frac{\sum_{i=1}^n p_{it} \cdot q_{iT} \cdot ff_{iT} \cdot c_{it}}{\sum_{i=1}^n p_{i0} \cdot q_{i0}} \cdot \text{Base} & \text{; October until July} \\ \text{Index}_j & \text{; August and September} \end{cases}$$

whereby:

$c_{it}$	=	Adjustment factor of company i at time t
$ff_{iT}$	=	Free-float factor of share class i at time T
$n$	=	Number of shares in the index
$p_{i0}$	=	Closing price of share i on the trading day before the first inclusion in an index of Deutsche Börse
$p_{it}$	=	Price of share i at time t
$q_{i0}$	=	Number of shares of company i on the trading day before the first inclusion in an index of Deutsche Börse
$q_{iT}$	=	Number of shares of company i at time T
$t$	=	calculation time of the index
$K_T$	=	Index-specific chaining factor valid as of chaining date T
$T$	=	Date of the last chaining

The formula set out below is equivalent in analytic terms, but designed to achieve relative weightings:

$$\text{Index}_t = \frac{\sum_{i=1}^n p_{it} \cdot (K_T \cdot \frac{ff_{iT} \cdot q_{iT}}{\sum_{i=1}^n q_{i0}} \cdot 100 \cdot c_{it})}{\sum_{i=1}^n p_{i0} \cdot \frac{q_{i0}}{\sum_{i=1}^n q_{i0}} \cdot 100} \cdot \text{Base} = \frac{\sum_{i=1}^n p_{it} \cdot F_i}{A} \cdot \text{Base}$$

$$\text{whereby: } A = \sum_{i=1}^n p_{i0} \cdot \frac{q_{i0}}{\sum_{i=1}^n q_{i0}} \cdot 100$$

$$\text{and: } F_i = K_T \cdot \frac{ff_{iT} \cdot q_{iT}}{\sum_{i=1}^n q_{i0}} \cdot 100 \cdot c_{it}$$

Index calculation can be reproduced in simplified terms by using the expression  $F_i$ :

- Multiply the current price by the respective  $F_i$  weighting factor;
- take the sum of these products; and

- divide this by the base value (A) which remains constant until a modification in the index composition occurs.

The  $F_i$  factors provide information on the number of shares required from each company to track the underlying index portfolio.

### 3.1.2 Computational Accuracy

The  $K_T$  chaining factors are used and published as figures rounded to seven decimal places.

The  $c_{it}$  adjustment factors are included in the index formula on the basis of six decimal places.

In the event of several adjustment events coinciding, such as “ex-dividend” and “ex subscription right” markdowns on the same day, only one single adjustment factor (six decimal places) is computed using the total markdown. Where several adjustment events are required for a single share but at different times, the factors rounded that way are multiplied by each other, and the product is rounded to six decimal places again.

When determining the  $c_{it}$  adjustment factor for subscription rights, the rights value is used as a figure with two decimal places. Only in the case of a capital increase out of company reserves, such rights value is not rounded at all. If a dividend disadvantage has to be prorated (e.g. for three months), the value of such disadvantage used for index calculation is rounded to two decimal places.

The free-float-factors are used as figures rounded to four decimal places.

The indices are rounded to two decimal places and published accordingly. The  $F_i$  factors are rounded to five decimal places and published accordingly, changing with each share-specific adjustment.

### 3.1.3 Cap Limit

On the day of regular quarterly chaining, the weighting of any single company in DivDAX®, DAXplus® Export Strategy and in DAXplus® Seasonal Strategy is capped to 10 percent of the index capitalization, respectively.

For this purpose, the index capitalization is computed using the total number of all freely available shares. If any single class of shares accounts for a share of more than i.e. 10 percent in the respective capitalization, the number of shares used as weight for that company is reduced to 10 percent of the index capitalization (which is being reduced accordingly). Should yet another company exceed the cap limit after that, the capitalization is to be determined with which both companies would account for exactly 10 percent of the revised index capitalization. This procedure is repeated for as long as there is no company exceeding the respective cap limit. Then the next smaller integer of shares resulting in the desired capitalization is used as the new weight for calculating the index.

Where the capped share of a company falls or rises below or above 10 percent during the quarter, it may only be raised or lowered to 10 percent again on the following chaining date as the above-described procedure is repeated for every single chaining process.

#### 3.1.4 New Listings and Deletion

Regular modifications to the index composition only occur if the ordinary chaining coincides with the actualization of the index composition at the same time. This process is predominantly based on the criteria as set out in: "Guide to the Equity Indices of Deutsche Börse".

#### 3.1.5 Chaining

In line with the concept conceived by Deutsche Börse for its indices, dividend payments and capital changes are initially reflected through an adjustment of the respective  $c_{it}$  adjustment factors. Quarterly chaining is carried out on the maturity date of the various equity index futures of Eurex, implying that on this day (i.e. on the third Friday of the last month of a quarter), the index is calculated for the last time on the basis of weights valid up to that point. Chaining is based on the Xetra<sup>®</sup> closing prices established on that day, with the new weights to be applied as from the following trading day.

A change in the index composition also becomes necessary in the event of an index component issue being or becoming subject to extraordinary circumstances, such as deletion, composition proceedings, bankruptcy, new admission, etc.

#### 3.1.6 Ordinary Chaining

The ordinary chaining procedure takes place on a quarterly basis and encompasses the following measures:

- The number of shares and the respective free-float-factors are updated in accordance with the capital changes carried out.
- The accumulated income from distributions and capital changes is allocated to the index component issues according to the respective new weights. For this purpose, the individual  $c_{it}$  adjustment factors are set to 1.
- A chaining factor is calculated to avoid a gap in the respective index.

If the ordinary chaining coincides with the actualization of the index composition at the same time, a change of the composition takes place additionally.

These measures help to prevent the weighting scheme from "ageing" due to capital changes and the accumulation of income.

Chaining is carried out in three steps:

a) *Calculation of the index value on the chaining date according to the old weighting scheme*

The following applies accordingly:

$$\text{Index}_t = K_T \cdot \frac{\sum_{i=1}^n p_{it} \cdot \text{ff}_{iT} \cdot q_{iT} \cdot c_{it}}{\sum_{i=1}^n p_{i0} \cdot q_{i0}} \cdot \text{Base}$$

This value corresponds to the closing index published on the date of chaining, and is used with two decimal places (as published) for all subsequent calculations.

*b) Computation of an interim value*

The interim value is computed using the number of shares valid on the chaining date ( $q_{i,T+1}$ ) and the current free-float factors ( $\text{ff}_{i,T+1}$ ). The  $c_{it}$  adjustment factors are set to 1.

The following applies accordingly:

$$\text{Interim value} = \frac{\sum_{i=1}^n p_{it} \cdot \text{ff}_{i,T+1} \cdot q_{i,T+1}}{\sum_{i=1}^n p_{i0} \cdot q_{i0}} \cdot \text{Base}$$

The interim value is used as an exact figure for subsequent calculations.

*c) Calculation of the new chaining factor*

The following applies accordingly:

$$K_{T+1} = \frac{\text{Index}_t}{\text{Interim value}}$$

After chaining, the index is computed on the basis of the new chaining factor ( $K_{T+1}$ ).

After calculation of the chaining factor, capital changes and dividend payments due on the date of chaining are taken into account via the  $c_{it}$  factor.

The  $F_i$  weighting factors of the index formula based on relative weights are calculated as follows:

$$F_i = K_{T+1} \cdot \frac{\text{ff}_{i,T+1} \cdot q_{i,T+1} \cdot c_{it}}{\sum_{i=1}^n q_{i0}} \cdot 100$$

**3.1.7 Unscheduled Chaining**

In the event of a change in the index composition, chaining is carried out in line with the procedure described in section 3.1.6 above, however, usually without adjustment to the number of shares and the various cit factors. Newly included issues are taken into account with their respective current number of shares.

Computation of the interim value is based on the component issues of the revised index portfolio.

$$\text{Interim value} = \frac{\sum_{i=1}^n p_{it} \cdot ff_{iT} \cdot q_{iT} \cdot c_{it}}{\sum_{i=1}^n p_{i0} \cdot q_{i0}} \cdot \text{Base}$$

With the new chaining factor to result as

$$K_{T+1} = \frac{\text{Index}_t}{\text{Interim value}}$$

If a newly included company was not listed in the Frankfurt Stock Exchange's Prime Standard or General Standard segments on the base date, the number of shares ( $q_{i0}$ ) and the price ( $p_{i0}$ ) must be sourced from the Third Segment (Open Market – OTC market) as per that base date. If the company was not listed in Frankfurt at all, the corresponding figures from the respective domestic exchange are used for the index calculation instead. If the company was not listed at all on the base date of the index, the basis number of shares ( $q_{i0}$ ) corresponds to the number of shares at the time of admission to trading. The basis price ( $p_{i0}$ ) is the first price available at the time of such admission.

**3.2 DAXplus Covered Call and DAXplus Protective Put****3.2.1 Index Formulas****A. DAXplus Covered Call**

On Xetra® trading days DAXplus® Covered Call is calculated as follows:

$$CC_t = \frac{DAX_t - C_t}{DAX_s - C_0} \cdot CC_s$$

The rolling is carried out monthly on every third Friday.

$$CC_s = \frac{DAX_s - C'_s}{DAX_{s-m} - C'_0} \cdot CC_{s-m}$$

whereby:

$CC_t$  = covered call index at time t

$CC_s$  = settlement value of covered call index at last rolling day



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$CC_{s-m}$	=	settlement value of covered call index at previous rolling day
$DAX_t$	=	last price of DAX <sup>®</sup> at time t
$DAX_s$	=	settlement price of DAX at last rolling day
$DAX_{s-m}$	=	settlement price of DAX at previous rolling day
$C_t$	=	last price of call option at time t
$C_0$	=	inclusion price of new call option at last rolling day
$C'_s$	=	settlement price of old call option at last rolling day
$C'_0$	=	inclusion price of old call option at previous rolling day

### B. DAXplus Protective Put

On Xetra<sup>®</sup> trading days DAXplus<sup>®</sup> Protective Put is calculated as follows:

$$PP_t = \frac{DAX_t + P_t}{DAX_s + P_0} \cdot PP_s$$

The rolling is carried out on third Friday at the end of each quarter.

$$PP_s = \frac{DAX_s + P'_s}{DAX_{s-m} + P'_0} \cdot PP_{s-m}$$

whereby:

$PP_t$	=	protective put index at time t
$PP_s$	=	settlement value of protective put index on last rolling day
$PP_{s-m}$	=	settlement value of protective put index one rolling before
$DAX_t$	=	last price of DAX <sup>®</sup> before time t
$DAX_s$	=	settlement price of DAX on last rolling day
$DAX_{s-m}$	=	settlement price of DAX one rolling before
$P_t$	=	last price of put option before time t
$P_0$	=	inclusion price of new put option on last rolling day
$P'_s$	=	settlement price of old put option on expiry day
$P'_0$	=	inclusion price of old put option one rolling before

**3.2.2 Computational Accuracy**

DAX<sup>®</sup>, DAX Call Option, DAX Put Option, DAXplus<sup>®</sup> Covered Call index and DAXplus<sup>®</sup> Protective Put index are published as figures rounded to two decimal places.

**3.2.3 Rolling**

DAXplus<sup>®</sup> Covered Call requires a monthly rollover operation, whereby the old call option ceases trading at 1.00 p.m. CET on the pre-determined rollover date, and is replaced by a new option whose last trading day falls on the next rollover date. The new call option must have a remaining lifetime of one month, and must be 5 percent out of the money (i.e. the highest strike price below or equal to the DAX<sup>®</sup> settlement price plus 5 percent).

The DAXplus Protective Put requires a quarterly rollover operation, whereby the old put option ceases trading at 1.00 p.m. CET on the pre-determined rollover date, and is replaced by a new put option whose last trading day falls on the next rollover date. The new option must have a remaining lifetime of three months, and must be 5 percent out of the money (i.e. the lowest strike price above or equal to the DAX settlement price minus 5 percent).

The prices at which the call- and put options are included in the respective index are based on the weighted averages of all best bids for call options and best asks for put options quoted on Eurex<sup>®</sup> between 1.15 p.m. and 1.45 p.m. CET.

**3.2.4 Trading Interruption/Suspension**

If there is any interruption/suspension of the DAX<sup>®</sup> index or the DAX call option which is included in DAXplus<sup>®</sup> Covered Call or DAX put option which is included in the DAXplus<sup>®</sup> Protective Put at any time then the index will be calculated with the latest prices which will be available.

If suspension occurs on a rolling day during the averaging process, only bids before the interruption/suspension will be considered.

In case averaging does not start at all (i.e. interruption/suspension starts before 1.15 p.m. CET) then the averaging will be delayed until the end of the interruption/suspension on the same index business day. 30 minutes after the end of the interruption/suspension the averaging will start and will then take 30 minutes.

If the interruption/suspension will continue until the end of trading then the averaging will be delayed until the next index business day at 1.15 p.m. CET.

**3.3 Leveraged and Short Indices****3.3.1 Index Formula**

Leveraged and short Indices are calculated as follows:

$$\text{LevIDX}_t = \text{LevIDX}_T \cdot \left[ \underbrace{1 + L \cdot \left( \frac{\text{IDX}_t}{\text{IDX}_T} - 1 \right)}_{\text{Leverage}} + \underbrace{\left( (1-L) \cdot \text{IR}_T + L \cdot c_M \right) \cdot \frac{d}{360}}_{\text{Interest and Dividend}} \right]$$

	LEVERAGE TERM	FINANCE/INTEREST TERM
Where:		
L	= leverage factor	
IDX	= reference index	
IR	= interest rate:	
	Daily Leverage Indices: EONIA + (EURIBOR (12M) - 1Y EONIA Swap Rate)	
	Daily Short Indices: EONIA	
	Monthly Leverage / Short Indices: EURIBOR (1M)	
$c_M$	= cost of borrowing (short indices)	
t	= time of calculation	
T	= time of last rebalancing (last trading day resp. third Friday)	
d	= number of calendar days between t and T	

The leverage term describes the effect of index movements on leveraged and short Indices. The “finance term” indicates the costs caused by raising capital and reinvesting into the reference index portfolio. The “interest term” represents the additional interest generated by selling the reference index portfolio and the risk-free investment of the proceeds. Euro Overnight Index Average (EONIA) is the effective reference rate computed daily as a weighted average of all overnight unsecured lending transactions undertaken in the interbank market by European Central Bank since 1 January 1999. Up to this date the daily interest provided by Deutsche Bundesbank has been used for calculation. The Euro Interbank Offered Rate (EURIBOR) is a daily reference rate based on the averaged interest rates at which banks offer to lend unsecured funds to other banks in the euro wholesale money market (or interbank market). Prior to its introduction on 1 January 1999 Frankfurt Interbank Offered Rate (FIBOR) has been used.

The liquidity Spread (EURIBOR (12M) – 1Y EONIA Swap Rate) is updated on a monthly basis. It is determined using the average over the liquidity spreads of five index calculation days ranging from 5th last to the last calculation day prior to each monthly rebalancing date (3rd Friday). To calculate the liquidity spread, the closing values of the 1Y EONIA (swap rates) are taken.

The cost of borrowing will be updated on a monthly basis as described below:

$$c_M = \sum_i w_{i,M} \cdot c_{i,M}$$

Where:

$c_M$	= Cost of borrowing the Index at time M
$c_{i,M}$	= Cost of borrowing the share $i$ at time M
$w_{i,M}$	= Index weight of share $i$ at time M

The data is provided by Data Explorers, the aggregator of stock lending information.

The following leveraged and short Indices are calculated:

Index	Leverage factor L
LevDAX® x2	2
LevDAX® x2 Monthly	2
LevDAX® x3	3
LevDAX® x4	4
LevDAX® x5	5
LevDAX® x6	6
LevDAX® x7	7
LevDAX® x8	8
LevDAX® x9	9
LevDAX® x10	10
ShortDAX®	-1
ShortDAX® x2	-2
ShortDAX® x2 Monthly	-2
ShortDAX® x3	-3
ShortDAX® x4	-4
ShortDAX® x5	-5
ShortDAX® x6	-6
ShortDAX® x7	-7
ShortDAX® x8	-8
ShortDAX® x9	-9
ShortDAX® x10	-10
ShortMDAX® x1	-1
ShortTecDAX	-1
LevDAX® Optimal	L*

### 3.3.2 Calculation of the optimal leverage factor

The optimal leverage factor  $L^*$  is determined every month based on the risk-return profile of the underlying index. Relevant factors are the growth rate of the underlying index and the volatility reflected by the VDAX-NEW index.

$$L^* = L_r^* = \min\left(4; \max\left(\frac{1}{2}; \frac{1}{2} + \frac{\mu - r}{\sigma^2}\right)\right)$$

where:

$$r = IR_T$$

$$\mu = \text{growth rate of the underlying index, } \mu = \left( \frac{IDX_T}{IDX_0} \right)^{\frac{365}{T-30.12.1987}} - 1$$

$$\sigma = \text{volatility of the underlying index, } \sigma = \frac{VDAX - NEW}{100}$$

### 3.3.3 Adjustments due to extreme market movements

**Daily Leverage and Short Indices:** If daily leveraged or short indices drop by more than 50 percent at the time of calculation t in comparison to the closing prices on the last adjustment day T then the leverage will be adjusted. During the adjustment those prices are considered which are received at time t. No additional refinancing costs ("Financing Term") are calculated and no additional interests are credited ("Interest Term").

The rebalancing will be carried out by simulating a new day:

$$t := T \text{ (i.e. } IDX_T = IDX_t \text{ and LevIDX}_T = \text{LevIDX}_t)$$

$$d := 0$$

**Daily Leverage and Daily Short AR Indices:** The rebalancing is based on the average over all index values that occur in a time window of 10 minutes. The time window to calculate the average starts 5 minutes after and ends 15 minutes after the trigger event occurs. The rebalancing is triggered when the underlying index loses more than x% (leverage indices) or appreciates by more than x% (short indices) compared to its previous day's close.

The respective trigger values (x) are given in the following table:

Index	Leverage factor L
(L2)	x = -25,00%
(L3)	x = -16,66%
(L4)	x = -12,50%
(L5)	x = -10,00%
(L6)	x = -10,00%
(L7)	x = -10,00%
(L8)	x = -10,00%
(S1)	x = 50,00%
(S2)	x = 25,00%
(S3)	x = 16,66%
(S4)	x = 12,50%
(S5)	x = 10,00%

(S6)	x = 10,00%
(S7)	x = 10,00%
(S8)	x = 10,00%

Over the course of the 10 minute period in which the average is determined, the index is not disseminated. The index dissemination ends 5 minutes after the trigger event and is resumed with an index level equal to the determined average 15 minutes after the trigger event.

Should the intraday rebalancing be triggered less than 15 minutes prior to the end of the index calculation day, the regular overnight rebalancing is carried out.

If the strategy index reaches a value of 0 or below over the course of the 15, the index is set to a value of 0 and its calculation / dissemination is discontinued

**Monthly Leveraged Indices:** If the reference index (closing value) rises or falls by more than 40% in the course of the month, the monthly leveraged and short indices will be subject to an extraordinary adjustment. The leverage factor will be adjusted based on the closing value of the reference index. Herewith the risk of a potential total loss is minimized. The monthly leveraged and short indices have a floor value of zero.

#### 3.3.4 Reverse Split

If the closing value of a daily leverage or short index drops below 100 index points, a reverse split is carried out. The leverage index is multiplied with a factor of 1000 whereas the Short index is multiplied with a factor of 1000.

The reverse split is carried out based on the index close ten trading days after the index initially dropped below a closing value of 100 points, notwithstanding whether the index rises above a level of 100 points in the meantime.

For optimal leverage indices as well as for monthly adjusted leverage and short indices, no reverse split is carried out.

#### 3.3.5 Leverage Effect

The leverage effect causes an over proportional change of capital, employed during positive and negative market movements. This effect can be achieved by raising additional capital and reinvesting into the reference index and by investing capital from purchases and additional interests respectively. Therewith, investors can make use of this opportunity to employ a profitable investment strategy with low initial capital in order to multiply the chances of profit considerably. On the other hand this leverage effect inherits the risk of an over proportional capital loss ("downside risk").

#### 3.3.6 Computational Accuracy

Leveraged and short Indices are published rounded to two decimal places.

All adjustment factors of the reference index are described in the "Guide to the Equity Indices of Deutsche Börse".

### 3.4 DAXplus Minimum Variance/ Maximum Sharp Ratio Germany

#### 3.4.1 Weight Calculation

The weight calculation of DAXplus<sup>®</sup> Minimum Variance Germany and DAXplus<sup>®</sup> Maximum Sharp Ratio Germany takes place in three steps.

##### Step 1)

First the continuous day's yield for each DAX<sup>®</sup> constituent over the last twelve months must be calculated as follows:

$$\lambda_{ik} = \ln\left(\frac{\text{Share}_{ik}}{\text{Share}_{ik-1}}\right)$$

whereby:

$\lambda_{ik}$  = continuous day's yield of share  $i = 1, \dots, 30$  at the time  $k = 1, \dots, \text{HT}$

$\text{Share}_{ik}$  = closing price of share  $i = 1, \dots, 30$  at the time  $k = 2, \dots, \text{HT}$

$k$  = trading day index

$\text{HT}$  = number of trading days over the last twelve months

##### Step 2)

On the basis of the yields determined in step 1 for all DAX constituents the variances and the covariances are calculated as follows:

$$\sigma_i = \sqrt{\text{HT} \cdot \frac{1}{\text{HT} - 1} \sum_{k=1}^{\text{HT}} (\lambda_{ik} - \bar{\lambda}_i)^2}$$

whereby:

$\sigma_i$  = standard deviation of share  $i = 1, \dots, 30$

$\bar{\lambda}_i$  = average yield of share  $i = 1, \dots, 30$

$$\text{Cov}_{i,j} = \text{HT} \cdot \frac{1}{\text{HT} - 1} \sum_{k=1}^{\text{HT}} (\lambda_{ik} - \bar{\lambda}_i) \cdot (\lambda_{jk} - \bar{\lambda}_j)$$

whereby:

$\text{Cov}_{i,j}$  = covariance<sup>4</sup> of share  $i = 1, \dots, 30$  to share  $j = 1, \dots, 30$

##### Step 3)

<sup>4</sup>) In case  $i=j$  the covariance is the same as the variance of share  $i$ .

On the basis of the variances and covariances determined in step 2 the weights can be calculated which leads to an optimized portfolio. For DAXplus Minimum Variance Germany the function to be optimized applies as follows:

$$\sigma^2_{\text{Portfolio}} = \sum_{i=1}^{30} \sum_{j=1}^{30} X_i \cdot X_j \cdot \text{Cov}_{i,j} = \sum_{i=1}^{30} \sum_{j=1}^{30} X_i \cdot X_j \cdot \sigma_i \cdot \sigma_j \cdot \rho_{i,j}$$

$X_i$  = weight of share  $i = 1 \dots 30$  in DAX portfolio

$\rho_{i,j}$  = correlation coefficient of share  $i = 1 \dots 30$  to share  $j = 1 \dots 30$

$\sigma^2_{\text{Portfolio}}$  = variance of DAX portfolio

The correlation coefficient describes the reaction of a share to the price change of another share in the same portfolio and can be calculated as follows:

$$\rho_{i,j} = \frac{\text{Cov}_{i,j}}{\sigma_i \cdot \sigma_j}$$

For DAXplus Maximum Sharpe Ratio Germany the function to be optimized applies as follows:

$$sr_p = \frac{r_p - r_f}{\sigma_{\text{Portfolio}}}$$

The Sharpe ratio reflects the difference between achieved or designated return of the portfolio and the risk-free return in relation to the portfolios standard deviation. By maximization of this ratio the difference between the two returns shall be maximized as well, thus the selected portfolio return exceeds the risk-free interest yield, whereas the risk of the portfolio reminds in focus as well.

$$r_p = \pi_1 \cdot X_1 + \dots + \pi_n \cdot X_n$$

$$\pi_i = \ln \left( \frac{\text{Share}_{i\text{Endoftheyear}}}{\text{Share}_{i\text{Beginningoftheyear-1}}} \right)$$

$\pi_i$  = annual return of constituent  $i = 1, \dots, 30$

$r_p$  = designated return for the entire portfolio

$$\sigma_{\text{Portfolio}} = \sqrt{\sigma^2_{\text{Portfolio}}}$$

$\sigma_{\text{Portfolio}}$  = standard deviation of the entire portfolio

$r_f$  = risk- free return on capital market

Following the optimization models with objective function and constraints:



**A) DAXplus Minimum Variance Germany:**

$$\min \sigma_{\text{Portfolio}}^2 = \sum_{i=1}^{30} \sum_{j=1}^{30} x_i \cdot x_j \cdot \sigma_i \cdot \sigma_j \cdot \rho_{i,j}$$

**B) DAXplus Maximum Sharpe Ratio Germany:**

$$\max sr_p = \frac{r_p - r_f}{\sigma_{\text{Portfolio}}}$$

The objective functions are minimized respectively maximized subject to the following constraints:

$$\text{Constraint 1: } \sum_{i=1}^{30} x_i = 1$$

The first constraint indicates that the weight sum must be 100 percent. However, for single constituent the weight with 0.00 percent can also occur. These constituents won't be considered in the index.

$$\text{Constraint 2: } x_i \geq 0 \text{ for } (i=1, \dots, 30)$$

The second constraint completes the mathematical model taking into account the non-negativity of the weight as well as exclusion of short sales.

$$\text{Constraint 3: } x_i \leq 0.1 \text{ for } (i=1, \dots, 30)$$

The third constraint makes sure that the weight of each constituent is restricted to 10 percent.

In case of negative value for the objective function of DAXplus Maximum Sharpe Ratio Germany, the constituents from the last index composition are considered and weighted equally.

**3.4.2 Weighting Factors Calculation**

The weighting factors  $q_{iT}$  are derived using the weights which were determined in chapter 3.4.1. For each constituent the weight  $x_i$  is multiplied by the scale factor 1 bn. and divided by the current price  $p_{it}$ . Reference date for the calculation is the last trading day of the month preceding the chaining month. The calculation of the weighting factors ( $q_{iT}$ ) will be carried out using the closing prices of this date. The determined weighting factors become effective for the index calculation on the next chaining Friday.

$$q_{iT} = \frac{x_i}{p_{it}} \cdot 1 \text{ bn.}$$

The scale factor 1 bn. is defined as the sum of the product of the prices  $p_{it}$  and weighting factors  $q_{iT}$ .

The weighting factors are kept constant for the following three months after the chaining procedure.

### 3.4.3 Index Formula

The weighting factors  $q_{iT}$  are kept constant between two chaining dates and DAXplus<sup>®</sup> Minimum Variance Germany and DAXplus<sup>®</sup> Maximum Sharpe Ratio Germany are calculated as follows:

$$\text{Index}_t = K_T \cdot \frac{\sum_{i=1}^n p_{it} \cdot q_{iT} \cdot c_{it}}{\sum_{i=1}^n p_{i0} \cdot q_{i0}} \cdot \text{Base}$$

whereby:

$c_{it}$	=	Adjustment factor of company i at time t
$n$	=	Number of shares in the index
$p_{i0}$	=	Closing price of share of company i on the trading day before the first inclusion in an index of Deutsche Börse
$p_{it}$	=	Price of share of company i at time t
$q_{i0}$	=	weighting factor of company i on the trading day before the first inclusion in an index of Deutsche Börse
$q_{iT}$	=	weighting factor of company i at time T
$t$	=	calculation time of the index
$K_T$	=	Index-specific chaining factor valid as of chaining date T
$T$	=	Date of the last chaining

The formula set out below is equivalent in analytic terms, but designed to achieve relative weightings:

$$\text{Index}_t = \frac{\sum_{i=1}^n p_{it} \cdot (K_T \cdot \frac{q_{iT}}{\sum_{i=1}^n q_{i0}} \cdot 100 \cdot c_{it})}{\sum_{i=1}^n p_{i0} \cdot \frac{q_{i0}}{\sum_{i=1}^n q_{i0}} \cdot 100} \cdot \text{Base} = \frac{\sum_{i=1}^n p_{it} \cdot F_i}{A} \cdot \text{Base}$$

whereby:

$$A = \frac{\sum_{i=1}^n p_{i0} \cdot q_{i0} \cdot 100}{\sum_{i=1}^n q_{i0}}$$

and:

$$F_i = K_T \cdot \frac{q_{iT}}{\sum_{i=1}^n q_{i0}} \cdot 100 \cdot c_{it}$$

Index calculation can be reproduced in simplified terms by using the expression  $F_i$ :

- Multiply the current price by the respective  $F_i$  weighting factor;
- take the sum of these products; and
- divide this by the base value (A) which remains constant until a modification in the index composition occurs.

The  $F_i$  factors provide information on the number of shares required from each company to track the underlying index portfolio.

#### 3.4.4 Computational Accuracy

DAXplus<sup>®</sup> Minimum Variance Germany and DAXplus<sup>®</sup> Maximum Sharpe Ratio Germany are published rounded to two decimal places.

All factors which are required for the calculation are rounded to two decimal places as well.

All DAX<sup>®</sup> adjustment factors are described in the “Guide to the Equity Indices of Deutsche Börse”.

#### 3.4.5 Chaining

The chaining<sup>5</sup> procedure for DAXplus<sup>®</sup> Minimum Variance Germany and DAXplus<sup>®</sup> Maximum Sharpe Ratio Germany takes place as described in chapters 3.1.5, 3.1.6 and 3.1.7 with the special focus on actualization of the weights  $x_i$  and weighting factors  $q_{iT}$  as defined in chapter 3.4.1 in step 3 and in chapter 3.4.2.

<sup>5</sup> The free-float factors  $f_{it}$  are set to 1.

### 3.5 DAXplus Maximum Dividend

#### 3.5.1 Index formula

$$\text{Index}_t = K_T \cdot \frac{\sum_{i=1}^n p_{it} \cdot q_{iT} \cdot c_{it}}{\sum_{i=1}^n p_{i0} \cdot q_{i0}} \cdot \text{Basis}$$

$c_{it}$  = Adjustment factor of company  $i$  at time  $t$

$n$  = Number of shares in the index

$p_{it}$  = Price of share of company  $i$  at time  $t$

$p_{iT}$  = Closing price of share of company  $i$  at time  $t$

$q_{iT}$  = weighting factor of company  $i$  at time  $T$

$t$  = calculation time of the index

$K_T$  = Index specific chaining factor valid as of chaining date  $T$

$T$  = Date of the last chaining

#### 3.5.2 Determination of weighting factors

The weighting factors are derived from the expected dividend yields by dividing the dividend yield  $DY_i$  by the current price  $p_i$  and multiplying by the normalization factor of 1 billion. The expected dividend yield is calculated on the basis of announced or expected dividends and the closing price at the time of the ranking.

$$DY_i = \frac{\sum_t d_{i,t}}{p_i}$$

whereby:

$d_{i,t}$  = announced or expected dividend payout for share  $i$  at time  $t$

$p_i$  = closing price of share  $i$  on the last trading day in April and October

$t$  = time within the upcoming six-month index calculation period

The index weights and weighting factors are calculated as follows:

$$w_i = \frac{DY_i}{\sum DY_i}$$

$$q_{i,T} = \frac{w_i}{p_{i,T}} \cdot 1 \text{ bn}$$

whereby:

$w_i$  = weight of share i

$DY_i$  = expected dividend yield of share i

$p_{i,T}$  = closing price of share i at time of the rebalancing

The weighting factors  $q_{iT}$  from each chaining remain stable for six month.

### 3.6 DAXplus Risk Trigger Germany

#### 3.6.1 Index formula

$$RTI_t = RTI_{t-1} \cdot \frac{Index_t}{Index_{t-1}}$$

whereby:

$t$  = calculation time of the index

$Index_t$  = DAX / eb.rexx Money Market, depending on the currently selected asset class

#### 3.6.2 Calculation Accuracy

DAXplus® Risk Trigger Germany is published rounded to two decimal places.

All adjustment factors are described in the “Guide to the Equity Indices of Deutsche Börse”.

### 3.7 Dividend Points Indices

#### 3.7.1 Index formula

DAX® Dividend Points and DivDAX® Dividend Points are calculated as follows:

$$DVP_t = DVP_{t-1} + DP_t,$$

with  $DP_t$  reflecting the dividend points of the underlying index portfolio.

The dividend points of the index portfolio are derived as follows:

$$DP_t = K_T \cdot \frac{\sum_{i=1}^n d_{it} \cdot q_{it} \cdot ff_{it} \cdot c_{it}}{\sum_{i=1}^n p_{i0} \cdot q_{i0}} \cdot \text{Basis}$$

$d_{it}$  = Distribution of share class i on ex-date t

The remaining parameters are identical to those used in the calculation of the underlying price index.

After the regular index chaining in December the Dividend Points index is reset to zero.

### 3.7.2 Calculation Accuracy

DAX® Dividends Points and DivDAX® Dividend Points are published rounded to two decimal places.

All adjustment factors are described in the “Guide to the Equity Indices of Deutsche Börse”.

## 3.8 DAXplus Family-Index

### 3.8.1 Index Formula

The indices of Deutsche Börse are based on the index formula of Laspeyres und are calculated as follows:

$$\text{Index}_t = K_T \cdot \frac{\sum p_{it} \cdot ff_{iT} \cdot q_{iT} \cdot C_{it}}{\sum p_{i0} \cdot q_{i0}} \cdot \text{Base}$$

whereby:

$C_{it}$	=	Adjustment factor of share i at time t
$ff_{iT}$	=	Free float factor of share i at time T
$n$	=	Number of shares in the index
$p_{i0}$	=	Closing price of share i on the trading day before the first inclusion in an index of Deutsche Börse
$p_{it}$	=	Price of share i at time t
$q_{i0}$	=	Number of shares of company i on the trading day before the first inclusion in an index of Deutsche Börse
$q_{iT}$	=	Number of shares of company i at time T
$t$	=	calculation time of the index
$K_T$	=	Index specific chaining factor valid as of chaining date T
$T$	=	Date of the last chaining

### 3.8.2 Calculation Accuracy

The DAXplus® Family index will be published rounded at two decimal places.

All adjustment factors refer to the “Guide to the Equity Indices of Deutsche Börse”.

### 3.9 DAX Risk Control Indices

#### 3.9.1 Index Formula

$$IndexTR_t = IndexTR_{t-1} \times \left[ 1 + w_{t-1} \times \left( \frac{DAX_t}{DAX_{t-1}} - 1 \right) + (1 - w_{t-1}) \times \left( (EONIA_{t-1}) \frac{Diff(t-1,t)}{360} \right) \right]$$

$$IndexER_t = IndexER_{t-1} \times \left( 1 - EONIA_{t-1} \frac{Diff(t-1,t)}{360} \right) \times \left[ 1 + w_{t-1} \times \left( \frac{DAX_t}{DAX_{t-1}} - 1 \right) + (1 - w_{t-1}) \times \left( (EONIA_{t-1}) \frac{Diff(t-1,t)}{360} \right) \right]$$

where

$IndexER_t$	Excess Return Index Level on Index Level Determination Date t
$IndexER_{t-1}$	Excess Return on Index Level Determination Date t - 1
$IndexTR_t$	Total Return on Index Level Determination Date t
$IndexTR_{t-1}$	Total Return on Index Level Determination Date t - 1
$w_{t-1}$	Equity Weight on Index Level Determination Date t - 1
$DAX_t$	Level of the DAX (TR) Index on Index Level Determination Date t
$DAX_{t-1}$	Level of the DAX (TR) on Index Level Determination Date t - 1
$EONIA$	The EONIA rate on the Index Level Determination Date t
$Diff(t-1,t)$	Difference between t-1 and t measured in calendar days

#### 3.9.2 Determination of the Target Weight (Tgtw)

On any Index Level Determination Date t, the Target Weight shall be determined as follows:

$$Tgtw_t = \frac{TgtVol}{Max RealizedVol_{t,(20,60)}}$$

where:

$TgtVol$	5% (10%, 15%, 20%)
$Max RealizedVol_{20,60}$	is the maximum of the realized volatilities measured over 20 days and 60 days

$$RealizedVol_{t,n} = \sqrt{\frac{252}{n} * \sum_s \left[ \log \left( \frac{DAX_s}{DAX_{s-1}} \right) \right]^2}$$

wobei:

n	19 (59)
s	ranging from t-18 to t (t-58 to t)

**3.9.3 Determination of the Equity Weight and Index Rebalancing Days**

The Equity Weight on the Index Start Date shall be equal to the Target Weight at the Index Start Date,

$$w_0 = \text{Min}(Cap, Tgtw_0)$$

On any Index Level Determination Date  $t$  subsequent to the Index Start Date, the Equity Weight shall be determined as follows:

$$(i) \text{ If } \text{abs}\left\{1 - \frac{w_{t-1}}{Tgtw_{t-1}}\right\} > \text{Toleranz}$$

then the Index Level Determination Date  $t$  will be an Index Rebalancing Day and

$$w_t = \text{Min}(Cap, Tgtw_{t-1})$$

(ii) Otherwise, Index Level Determination Date  $t$  will not be an Index Rebalancing Day and

$$w_t = w_{t-1}$$

where:

Tolerance                    5%

$w_{t/t-1}$                     Equity Weight on Index Level Determination Date  $t / t - 1$

$Tgtw_{t-1}$                     Target Weight on Index Level Determination Date  $t-1$

$Cap$                          150%

**3.10 Currency-Hedged Indices**

The following definitions will be used throughout the chapter:

$H\_IDX_t$                     = hedged index for day  $t$

$UH\_IDX_t$                     = unhedged reference index (in hedged currency) for day  $t$

$t=0$                          = last calculation day of preceding month (reset date)

$t$                              = day of index calculation / number of calendar days since  $t=0$

$T$                              = number of calendar days in current month

$AF_t$                          = notional adjustment factor for day  $t$

$HR_{c,t}$                     = hedge ratio of currency  $c$  for day  $t$

$FX_{c,t}$                     = Spot currency rate for day  $t$

$FF_{c,t}$                     = 1-month forward currency rate for day  $t$

$IFF_{c,t}$                     = interpolated forward currency rate for day  $t$

$R_t$                          = return from hedging for day  $t$



All currency rates are expressed as units of foreign currency  $c$  per one unit of domestic (hedged) currency.

The adjustment factor  $AF_t$  reflects the changes in the notional value to be hedged between the  $t=0$  and  $t$ :

$$AF_t = \frac{UH\_IDX_t}{UH\_IDX_0}$$

The hedge ratio  $HR_{c,t}$  can be varied to arrive at index portfolios that are over- or under-hedged to varying degrees. Furthermore it can be used to hedge multi-currency portfolios.

To fully hedge a multi-currency portfolio, the hedge ratio of each currency is calculated as the sum of weights of the securities quoted in that currency:

$$HR_{c,t} = \sum_{i:ccy_i=c} w_{i,t}$$

The interpolated forward currency rate  $IFF_{c,t}$  corrects the 1-month forward rate – traded with a fixed 1-month maturity – to reflect the progressively closer expiry ( $t=T$ ) of the hedge. In other words, the interpolated 1-month forward rate linearly converges to the spot rate as  $t=T$  approaches:

$$IFF_{c,t} = FX_{c,t} + \left(1 - \frac{t}{T}\right) \cdot (FF_{c,t} - FX_{c,t})$$

From the above definition, it follows that  $IFF_{c,0} = FF_{c,0}$  and  $IFF_{c,T} = FX_{c,T}$ .

For each currency  $c$ , the contribution of hedging to the index return is defined as the product of the relevant hedge ratio by the return on the forward currency trade.

For instance, an investor knows in  $t=0$  that she will receive a payment of 1 unit of foreign currency in  $t=T$ . She could wait and convert it at the then prevailing spot rate  $FX_{c,T}$  and obtain  $1/FX_{c,T}$  units of domestic currency. Alternatively, she could enter a forward trade in  $t=0$  to sell the foreign currency in  $t=T$  at  $FF_{c,0}$ , thus obtaining  $1/FF_{c,0}$  units of domestic currency.

The P&L from the forward trade, as compared to a spot conversion, is thus  $P\&L_{c, [0,T]} = \frac{1}{FF_{c,0}} - \frac{1}{FX_{c,T}}$ .

By expressing the forward trade P&L as percentage of the payment value in domestic currency in  $t=0$  and rearranging the terms, the returns on the forward trade can be expressed as  $\frac{FX_{c,0}}{FX_{c,T}} - \frac{FX_{c,0}}{FF_{c,0}}$ .

The expression for forward trade returns can then be generalized as:

$$R_t = \sum_{c=1}^C HR_{c,t-1} \cdot \left( \frac{FX_{c,0}}{IFF_{c,t-1}} - \frac{FX_{c,0}}{IFF_{c,t}} \right)$$

### 3.10.1 Daily Hedged Indices

With daily hedged indices, the hedging trade is entered at the end of each calendar month. From that day onwards, the returns of the underlying, unhedged index are integrated by the returns from hedging. Moreover, the notional amount being hedged and the weight of the individual underlying currencies are adjusted on a daily basis.

At the cost of an increased trading activity, the daily hedging aims to timely and precisely offset the currency exposures of the index and is thus particularly suited to volatile markets.

The daily currency hedged indices are thus calculated as:

$$H\_IDX_t = H\_IDX_0 \cdot \left( \underbrace{\frac{UH\_IDX_t}{UH\_IDX_0}}_{\text{Performance of unhedged index}} + \sum_{d=1}^c AF_{d-1} \cdot R_d \right)$$

### 3.10.2 Monthly Hedged Indices

In the monthly hedged version, the forward hedge is set up once a month and remains unchanged until the next reset: the currency weights are fixed at each reset, as well as the notional hedge amount.

The monthly currency hedged indices are thus calculated as:

$$H\_IDX_t = H\_IDX_0 \cdot \left( \underbrace{\frac{UH\_IDX_t}{UH\_IDX_0}}_{\text{Performance of unhedged index}} + \sum_{c=1}^c HR_{c,0} \cdot \left( \underbrace{\frac{FX_{c,0}}{FF_{c,0}}}_{\text{Cost to hedge on the forward contract}} - \underbrace{\frac{FX_{c,0}}{IFF_{c,t}}}_{\text{Estimated gain or loss}} \right) \right)$$

The expression can be directly derived from the formula for daily currency hedged indices, by setting  $AF_t = AF_0$  and  $HR_{c,t} = HR_{c,0} \forall t$ .

## 3.11 DAXplus 30 Decrement 40 index

### 3.11.1 Index Formula

$$IV_t = IV_{t-1} \cdot \frac{U_t}{U_{t-1}} - D \cdot \frac{ACT(t-1,t)}{365}$$

whereby:

$IV_t$  = index value on day t

$IV_0$  = 708.68 on 04 January 2005

$U_t$  = index value of underlying DAX EUR (TR) index on day t

D = fixed index points decrement (40)

ACT(t-1,t) = number of actual calendar days between t-1 and t

### 3.12 idDAX 50 Equal Weight

#### 3.12.1 Index Formula

The idDAX 50 Equal Weight Index uses the Laspeyres index formula and are calculated as follows:

$$\text{Index}_t = K_T \cdot \frac{\sum_{i=1}^n p_{it} \cdot q_{iT} \cdot c_{it}}{\sum_{i=1}^n p_{i0} \cdot q_{i0}} \cdot \text{Base}$$

whereby:

$c_{it}$  = Adjustment factor of company i at time t

$n$  = Number of shares in the index

$p_{i0}$  = Closing price of share i on the trading day before the first inclusion in an index of Deutsche Börse

$p_{it}$  = Price of share i at time t

$q_{i0}$  = Weighting factor of company i on the trading day before the first inclusion in the idDAX 50 Equal Weight Index

$q_{iT}$  = Weighting factor of company i at time T

$t$  = calculation time of the index

$K_T$  = Index-specific chaining factor valid as of chaining date T

$T$  = Date of the last chaining

### 3.13 idDAX 50 Equal Weight Decrement 4.00%

#### 3.13.1 Index Formula

$$IV_t = IV_{t-1} \cdot \left( \frac{U_t}{U_{t-1}} - D \cdot \frac{\text{ACT}(t-1, t)}{365} \right)$$

whereby:

$IV_t$  = index value on day t

$IV_0$  = 100 on 21 March 2005

$U_t$  = index value of underlying idDAX 50 Equal Weight EUR (Net Total Return) index on day t

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D = constant number of percentage subtracted (4%)

$ACT_{(t-1,t)}$  = number of actual calendar days between t-1 and t

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### 3.14 **Index correction policies**

The correction of an index typically results from one of two scenarios:

internal calculation errors

external calculation errors

#### 3.14.1 **Internal errors**

If Deutsche Börse AG becomes aware of internal index calculation errors within a trading day, intraday values of the respective index are corrected for that specific day, if technically feasible and economically reasonable. Intraday values, which are not detected within the same trading day are not corrected but will retroactively be flagged as invalid.

If there are deviations that are considered significant by Deutsche Börse AG, index close values also will be corrected retroactively, if technically feasible and economically reasonable.

#### 3.14.2 **External errors**

Calculation errors, that are based on incorrect external data are corrected as soon as possible, if technically feasible and economically reasonable. If there are deviations that are considered significant by Deutsche Börse AG, index close values will also be corrected retroactively, if technically feasible and economically reasonable. Intraday values that are not corrected will retroactively be flagged as invalid.

#### 3.14.3 **Correction of index parameter values**

All index parameters that are published by Deutsche Börse AG in the context of the chaining process are only corrected or adjusted at the subsequent rebalancing date, as described in Chapter 3.1.6. This rule applies regardless of when Deutsche Börse AG became aware of facts that would change the index parameter values during the chaining process. An exception of this rule is made for the free float parameter.

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## 4 Adjustments

The performance indices of Deutsche Börse are adjusted for exogenous influences (e.g. price-relevant capital changes) by means of certain correction factors, assuming a reinvestment according to the “opération blanche”.

All continuously calculated indices require a simultaneous adjustment of systematic price changes. The prerequisite for this is to calculate the correction factor on an ex-ante basis.

Consequently, already the first “ex” price can be adequately included for index calculation purposes. The ex-ante incorporation of adjustments presupposes a general acceptance of the computation formula as well as a general availability of the parameters used.

All parameters necessary for the respective computation are available from Deutsche Börse via its website ([dax-indices.com](http://dax-indices.com)) on the evening before each adjustment. As with all other adjustment processes there may be differences between the calculated values and the actually traded prices. However, since a preliminary correction is necessary and any delay would be problematic, this procedure remains the most appropriate one.

The calculated adjustment factor and a synthetic price accordingly adjusted for this factor are used in the index from the ex date of a share as long as there is no “ex” price available.

A detailed description of price-relevant capital changes as well as a description of the calculation of the correction factor  $c_{it}$  can be found in [Guide to the Equity Indices of Deutsche Börse](#).

For customers Deutsche Börse provides a 10-calendar-days corporate action forecast.

### 4.1 Handling of exceptional unforeseeable cases

In the case of an exceptional unforeseeable event that is not considered in this rulebook, Deutsche Börse AG may under consideration of the respective facts, apply procedures that differ from the aforementioned rules in this rulebook. This holds true especially in cases where i) there are no applicable rules, ii) the application of present rules does not lead to a clear result, iii) the rules contradict each other, and/or iv) the application of these rules lead to an inappropriate situation in the stock market. An example of an inappropriate situation is if the strict application of the rules heavily influences the liquidity of a company's stock in the stock market. In the case that Deutsche Börse AG makes a decision that is outside the parameters of the rulebook, the decision will be published within an appropriate notice period.

### 4.2 Consideration of extreme economic situations and market disruptions

In times of extreme economic situations and market disruptions, especially in cases where the price source is unavailable (e.g. market suspension or restriction), Deutsche Börse AG will generally use the last available price data.

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Also in times of extreme economic cases, additional exceptions from this rulebook can be made, e.g. postponement of an ordinary review date. All such changes will be published within an appropriate notice period.

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## 5 General Information

### 5.1 Index Labels

An index is published with the label "A" ("amtlich") once the opening criteria are fulfilled. Where the opening criteria have not been met for an index on a certain trading day, an index value is derived from the last available prices at the end of the calculation period. Accordingly, this index is labelled "I" (indicative).

Subsequent index ticks are continuously checked for its deviation. Once an index specific threshold is breached, the corresponding index ticks are disseminated with an index supplement "U" (for unchecked, instead of "A" for amtlich) and an immediate operational check is triggered. If the deviation was justified (e.g. due to market conditions), the index will manually be switched back to "A", i.e. labelled in line with its corresponding status.

### 5.2 Historical Data

Historical index data exists for all indices, dating back at least to the respective base date.

Until 18 June 1999, inclusive, data had been generated on the basis of prices sourced from floor trading at the Frankfurt Stock Exchange. Since 21 June 1999, time series have been based on Xetra<sup>®</sup> price data.

Time series for the various indices are available from Market Data & Analytics – Customer Service (cf. chapter 6.2) at Deutsche Börse AG.

### 5.3 Licensing

The indices of Deutsche Börse are registered trademarks of Deutsche Börse AG and therefore protected against unlawful usage inside and outside Germany. Exchanges, banks and investment companies may, however, apply to Deutsche Börse for licenses to use these indices as underlying instruments for derivative instruments. The standardised licensing agreement grants the licensee the right to use the indices for any number of instruments, with the license fee set according to the actual usage. For enquiries regarding the licensing of indices, please contact Deutsche Börse, Market Data & Analytics (cf. chapter 6.2).

### 5.4 Index Termination Policy

For the termination of an index or an index family for which outstanding products are present in the market, to the knowledge of Deutsche Börse AG, a market consultation will be initiated by Deutsche Börse AG to take into account market participants' views and concerns related to the termination. The length of the consultation period will vary based on the specific issues of each proposed termination. During the term of the consultation period, clients have the chance to share their concern regarding the termination. Based on the collected feedback, Deutsche Börse AG may rethink its decision to terminate and index or an index family. At the end of the consultation period, Deutsche Börse AG will



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publicly announce its final decision about the termination. A transition period will be granted.

For the termination of an index or index family for which, to the knowledge of Deutsche Börse AG, there are no listed financial products issued in the market, no market consultation will be conducted.

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**6 Appendix**

**6.1 ISINs and Alpha Codes**

Index	Alpha (Price)	ISIN (Price)	Alpha (Gross)	ISIN (Gross-TR)	Alpha (Net)	ISIN (Net-TR)
DivDAX®	GSUK	DE000A0C33C3	GSUL	DE000A0C33D1		
DivMSDAX	2DW3	DE000A0Z3LT6	2DW2	DE000A0Z3LS8		
DAXplus® Seasonal Strategy	D1AA	DE000A0C4BU0	D1AB	DE000A0C4BV8		
DAXplus® Export Strategy	D1EK	DE000A0C4BW6	D1EP	DE000A0C4BX4		
DAXplus® Covered Call			D3CC	DE000A0C4BY2		
DAXplus® Protective Put			D1A8	DE000A0C4CS2		
DAXplus® Minimum Variance Germany (EUR)	XEFM	DE000A0METM0	XEFN	DE000A0METN8	445P	DE000A1EXPH3
DAXplus® Minimum Variance Germany (USD)	XEFZ	DE000A0METZ2	XEF0	DE000A0MET03	445R	DE000A1EXPK7
DAXplus® Minimum Variance Germany (GBP)	XEGB	DE000A0MEUB1	XEGC	DE000A0MEUC9	445Q	DE000A1EXPJ9
DAXplus® Maximum Sharpe Ratio Germany (EUR)	XEFK	DE000A0METK4	XEFL	DE000A0METL2	445S	DE000A1EXPL5
DAXplus® Maximum Sharpe Ratio Germany (USD)	F9MF	DE000A0ME7F9	F9MG	DE000A0ME7G7	445U	DE000A1EXPN1
DAXplus® Maximum Sharpe Ratio Germany (GBP)	F9MS	DE000A0ME7T0	F9MT	DE000A0ME7U8	445T	DE000A1EXPM3
DAXplus® Maximum Dividend	1NGX	DE000A0XXEA4	1NGL	DE000A0XXDZ3		
DAXplus® Risk Trigger Germany			G7X3	DE000A0X7J39		
DAX® Dividend Points			1MZB	DE000A0XXAL9		
DivDAX® Dividend Points			G73K	DE000A0X7KL8		
DAXplus® Family	D1BM	DE000A0YKTM2	D1BL	DE000A0YKTL4		
DAXplus® Family 30	D1BP	DE000A0YKTP5	D1BN	DE000A0YKTN0		
idDAX® 50 Equal Weight	OTMU	DE000A2FG2Q2	OTMW	DE000A2FG2S8	OTMV	DE000A2FG2R0
idDAX® 50 Equal Weight Decrement 4.00%	OTM8	DE000A2FG242				

## Leverage &amp; Short Indices

LevDAX® x2	2DMT	DE000A0Z3JF9	D1AJ	DE000A0C4B34		
LevDAX® x2 AR	DL36	DE000A1EX242	DL3Y	DE000A1EX2X9		
LevDAX® x3	DL37	DE000A1EX259	DL3Z	DE000A1EX2Y7		
LevDAX® x3 AR	DH6A	DE000A1EXY51	DH56	DE000A1EXY02		
LevDAX® x4	2DMV	DE000A0Z3JH5	4NAS	DE000A0SNAM8		
LevDAX® x4 AR	DL38	DE000A1EX267	DL31	DE000A1EX2Z4		
LevDAX® x5	DH6B	DE000A1EXY69	DH57	DE000A1EXY10		
LevDAX® x5 AR	DL39	DE000A1EX275	DL32	DE000A1EX200		
LevDAX® x6	DH6C	DE000A1EXY77	DH58	DE000A1EXY28		
LevDAX® x6 AR	DL30	DE000A1EX283	DL33	DE000A1EX218		
LevDAX® x7	DH6D	DE000A1EXY85	DH59	DE000A1EXY36		
LevDAX® x7 AR	DN2A	DE000A1EX291	DL34	DE000A1EX226		
LevDAX® x8	DH6E	DE000A1EXY93	DH50	DE000A1EXY44		
LevDAX® x8 AR	DN2B	DE000A1EX3A5	DL35	DE000A1EX234		

LevDAX® x9	OJBD	DE000A13PHW5	OJBE	DE000A13PHX3		
LevDAX® x10	OJBF	DE000A13PHY1	OJBG	DE000A13PHZ8		
LevDAX® x2 Monthly			2DWK	DE000A0Z3K92		
LevDAX® Optimal	2DWZ	DE000A0Z3LP4	2DW0	DE000A0Z3LQ2		
ShortDAX®	2DMM	DE000A0Z3H97	D1A8	DE000A0C4CT0		
ShortDAX® AR	DL3N	DE000A1EX2M2	DL3F	DE000A1EX2D1		
ShortDAX® x2	2DMP	DE000A0Z3JB8	D1A9	DE000A0SNAK2		
ShortDAX® x2 AR	DL3P	DE000A1EX2N0	DL3G	DE000A1EX2E9		
ShortDAX® x3	DL3Q	DE000A1EX2P5	DL3H	DE000A1EX2F6		
ShortDAX® x3 AR	DH6K	DE000A1EXZF6	DH6F	DE000A1EXZA7		
ShortDAX® x4	2DMR	DE000A0Z3JD4	4NAQ	DE000A0SNAL0		
ShortDAX® x4 AR	DL3R	DE000A1EX2Q3	DL3I	DE000A1EX2G4		
ShortDAX® x5	DH6L	DE000A1EXZG4	DH6G	DE000A1EXZB5		
ShortDAX® x5 AR	DL3S	DE000A1EX2R1	DL3J	DE000A1EX2H2		
ShortDAX® x6	DH6M	DE000A1EXZH2	DH6H	DE000A1EXZC3		
ShortDAX® x6 AR	DL3T	DE000A1EX2S9	DL3K	DE000A1EX2J8		
ShortDAX® x7	DH6N	DE000A1EXZJ8	DH6I	DE000A1EXZD1		
ShortDAX® x7 AR	DL3U	DE000A1EX2T7	DL3L	DE000A1EX2K6		
ShortDAX® x8	DH6P	DE000A1EXZK6	DH6J	DE000A1EXZE9		
ShortDAX® x8 AR	DL3V	DE000A1EX2U5	DL3M	DE000A1EX2L4		
ShortDAX® x9	OJBH	DE000A13PH09	OJBJ	DE000A13PH17		
ShortDAX® x10	OJBK	DE000A13PH25	OJBL	DE000A13PH33		
ShortDAX® x2 Monthly			2DWL	DE000A0Z3LA6		
ShortMDAX® x1	X2HV	DE000A1X2XY4	X2HW	DE000A1X2XZ1		
ShortTecDAX			2DWX	DE000A0Z3LM1		
ShortTecDAX AR	DL3X	DE000A1EX2W1	DL3W	DE000A1EX2V3		

## Risk Control Indices

DAX Risk Control 5% RV (ER)			2DWM	DE000A0Z3LB4		
DAX Risk Control 5% RV (TR)			2DWN	DE000A0Z3LC2		
DAX Risk Control 10% RV (ER)			2DWR	DE000A0Z3LF5		
DAX Risk Control 10% RV (TR)			2DWS	DE000A0Z3LG3		
DAX Risk Control 15% RV (ER)			2DWT	DE000A0Z3LH1		
DAX Risk Control 15% RV (TR)			2DWU	DE000A0Z3LJ7		
DAX Risk Control 20% RV (ER)			2DWV	DE000A0Z3LK5		
DAX Risk Control 20% RV (TR)			2DWW	DE000A0Z3LL3		

## Hedged Indices

DAX Monthly Hedged AUD (Pr)	OJBX	DE000A13PJE9				
DAX Monthly Hedged CHF (Pr)	OJBY	DE000A13PJF6				
DAX Monthly Hedged JPY (Pr)	OJBZ	DE000A13PJG4				
DAX Monthly Hedged USD (Pr)	OJBO	DE000A13PJH2				
DAX Monthly Hedged AUD (TR)			OJB1	DE000A13PJJ8		
DAX Monthly Hedged CHF (TR)			OJB2	DE000A13PK6		
DAX Monthly Hedged JPY (TR)			OJB3	DE000A13PJL4		
DAX Monthly Hedged USD (TR)			OJB4	DE000A13PJM2		
HDAX Monthly Hedged CHF (TR)			OJEC	DE000A161DC0		
HDAX Monthly Hedged USD (TR)			OJED	DE000A161DD8		
HDAX Monthly Hedged CHF (Pr)	OJEA	DE000A161DA4				
HDAX Monthly Hedged USD (Pr)	OJEB	DE000A161DB2				
HDAX Daily Hedged USD (TR)			X2HZ	DE000A1X2Y25		
DAXplus 30 Decrement 40 EUR (Pr)	OJHO	DE000A161F06				

## 6.2

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