GUIDE TO THE INAV® CALCULATION

Version 2.5 - March 2022

STOXX LTD.

GUIDE TO THE INAV® CALCULATION

GENERAL INFORMATION

In order to ensure the highest quality of each of its products, STOXX exercises the greatest care when calculating indicative net asset values (iNAV®) on the basis of the rules set out in this Guide.

However, STOXX cannot guarantee that the various iNAV®, as set out in this Guide, are always calculated free of errors. STOXX accepts no liability for any direct or indirect losses arising from any incorrect calculation of such iNAV®.

Decisions concerning the way of its iNAV® calculation are always taken by STOXX to the best of its knowledge and belief. STOXX shall not be liable for any losses arising from such decisions.

The iNAV® of STOXX do not represent a recommendation for investment of whatever nature. In particular, the compilation and calculation of the various iNAV® shall not be construed as a recommendation of STOXX to buy or sell individual securities, ETFs underlying these iNAV® or the basket of securities underlying a given iNAV®.

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Document History[1]

22/03/2022	Version 2.5 Amendment of additional currencies and revision of document
02/01/2018	Version 2.4 Amendment of additional currencies and revision of document
15/04/2016	Version 2.3 Update of calculation times
01/05/2013	Version 2.2 Update of contacts
01/05/2009	Version 2.1 Amendment of additional currencies and revision of document
16/07/2007	Version 2.0 Amendment of additional currencies and revision of document
01/07/2006	Version 1.2 Amendment of additional currencies
01/10/2005	Version 1.1 Amendment of additional currencies
14/03/2005	Initial Version 1.0

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1   INTRODUCTION

The iNAV® calculation service of Deutsche Börse provides real-time fair values for investment funds and exchange traded funds (ETF) as a calculation service for the fund sponsor. iNAV® values are calculated and disseminated on a per fund share basis in real time during the relevant trading hours of the respective funds. The values are intended to provide investors and market participants a continuous indication of the fund value. The iNAV® values are usually calculated based on a valuation of the actual fund portfolio using real-time prices from all relevant exchanges and trading venues. A list of available sources can be provided upon request. The portfolio composition is updated daily and is provided directly by the fund administrator.

In some cases, the valuation of the portfolio based on the individual components is not possible. In these cases, a valuation is performed using the values of the respective benchmark index or futures contracts that best approximate the performance of the fund portfolio. The individual treatment of each fund is determined by the fund sponsor.

Prices Used and Calculation Frequency

In general, iNAV® calculation can be performed on every calculation day in the period from 01.00 am to 10.15 pm CET. The prices for calculation are taken from several pricing sources that include all major stock exchanges.

The calculation frequency depends on the individual fund sponsor's requirement. The typical calculation intervals range from every 15 seconds to every 60 seconds.

Dissemination

iNAV® values are disseminated via Deutsche Börse's CEF data feed and can be displayed on all major market data vendor terminals as well as on wide range of websites that display stock market data. An overview of market data vendors can be obtained here:

https://www.mds.deutsche-boerse.com/mds-en/real-time-data/vendorlist

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2 CALCULATION METHOD

2.1 Portfolio-based iNAV® Formula

The iNAV® based on actual portfolio composition is calculated according to the formula set out below:

$$iNAV_t = \frac{1}{N_t} \cdot \left[Cash + \sum p_{it} \cdot fx_{it} \cdot q_{it} \cdot c_{it} \right]$$

where:

iNAV$_t$	=	Value of iNAV® at time t
N$_t$	=	Number of shares of the fund at time t
Cash	=	Cash position of the fund
p$_{it}$	=	Price of underlying i in local currency at time t
fx$_t$	=	iNAV® currency conversion factor at time t
q$_{it}$	=	Amount of underlying i at time t
c$_{it}$	=	Adjustment factor of underlying i at time t
t	=	Calculation time of iNAV®

2.2 Special Calculation Methods

2.1.1 iNAV® Calculation based on Futures

For real-time calculation of iNAV® based on futures positions approximating the fund performance, the following calculation formula is used:

$$iNAV_t = \frac{Cash + \sum Fp_{it} \cdot cc_{it} \cdot q_{it} \cdot c_{it}}{N_t} \cdot FX_t$$

where:

iNAV$_t$	=	Value of iNAV® at time t
Cash	=	Cash position of the fund
Fp$_{it}$	=	Price of future i in local currency at time t
cc$_{it}$	=	Currency conversion factor of underlying price i at time t
q$_{it}$	=	Number of futures contracts i at time t
c$_{it}$	=	Contract value of future i at time t

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FX_t	=	iNAV® currency conversion factor at time t
N_t	=	Number of shares of the fund at time t
t	=	Calculation time of iNAV®

2.1.2 iNAV® based on Underlying Index

For iNAV® values that are based solely on the performance of an index underlying the corresponding fund the following calculation formula is used:

$$iNAV_t = \frac{NAV_{t-1}}{Index_{t-1}} \cdot cc_{it} \cdot Index_t \cdot FX_t$$

where:

$iNAV_t$	=	Value of iNAV® at time t
NAV_{t-1}	=	Official iNAV® of the fund on the previous day
$Index_{t-1}$	=	Closing value of the underlying index on the previous day
cc_{it}	=	Currency conversion factor of underlying price i at time t
$Index_t$	=	Current value of the underlying index on day of calculation
FX_t	=	iNAV currency conversion factor at time t
t	=	Calculation time of iNAV®
t-1	=	Calculation time of iNAV® on the previous day

2.1.3 iNAV® Calculation across Time Zones

For iNAV® that cover more than one time zone different methods may apply at different times. A portfolio containing US constituents could be evaluated based on a US market index future from 09.00 am CET to 03.30 pm CET and uses the actual market prices from US stock exchanges from 03.30 pm CET to 10.15 pm CET. Daylight saving times are adjusted automatically.

This procedure assures a maximum transparency throughout the trading day. However, it is important to mention that at the time of transition between two different valuation methods (in the above example at 03.30 pm) iNAV® levels may jump slightly due to market inefficiencies or differences between valuation methods and the necessity of currency conversion.

Such special arrangements differ for each individual iNAV® and are implemented on request from the fund sponsor. The following figure gives an overview about the global price coverage.
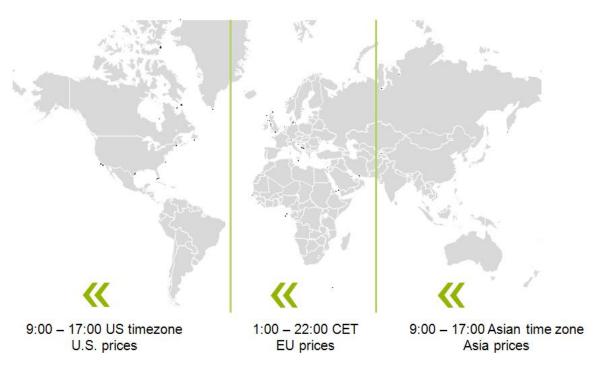
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9:00 – 17:00 US timezone
U.S. prices

1:00 – 22:00 CET
EU prices

9:00 – 17:00 Asian time zone
Asia prices

Figure 1: Global underlying pricing coverage

2.1.4 iNAV® Calculation using Proxy Instruments

For the same iNAV® that cover more than one time zone an even more sophisticated approach can be pursued. For example, a portfolio containing US constituents could be evaluated based on the returns of a sufficiently correlated market index future between 09.00 am CET and 03.30 pm CET and uses the actual market prices from US stock exchanges between 03.30 pm CET and 10.15 pm CET. Daylight saving times are adjusted automatically.

The difference between this approach and the one using e.g., an index or future between 09.00 am CET and 03.30 pm CET is that the intraday returns are considered and "appended" to e.g., the iNAV from the previous business day or to the NAV value. It is also worth mentioning that multiple suitable proxies can be used in sequence for different time periods.

2.3 CALCULATION ACCURACY

The iNAV® values are rounded to four decimal places and published accordingly.

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2.4 MULTI-CURRENCY INAV®

All iNAV® calculation is primarily carried out in Euro prices. In addition, STOXX can calculate iNAV® in various additional currencies:

Currency name	
Argentinian Peso	Mexican Peso
Australian Dollar	Morocco Dirham
Bahraini Dinar	New Zealand Dollar
Brazilian Real	Nigerian Naira
Bulgarian Lev	Norwegian Krone
Canadian Dollar	Oman Rial
Chilean Peso	Pakistan Rupee
Chinese Renmimbi	Peruvian Sol
Colombian Peso	Philippines Peso
Croatian Kuna	Polish Zloty
Czech Koruna	Quatar Riyal
Denmark Kroner	Romanian Leu
Egypt Pound	Russian Ruble
Great Britain Pound	Saudi Arabia Riyal
Hong Kong Dollar	Serbian Dinar
Hungary Forint	Singapore Dollar
Iceland Kronur	Slovakian Koruny
Indian Rupee	South Africa Rand
Indonesia Rupiahs	Swedish Krona
Israeli Shekel	Swiss Franc
Japanese Yen	Thailand Baht
Jordan Dinar	Taiwanese Dollar
Kenyan Shilling	Turkey Lira
Korea (South) Won	United Arab Emirates Dirham
Kuwait Dinar	United States of America Dollar
Macedonian Denar	Vietnam Dong
Malaysia Ringgits	

Figure 2: Overview of permissible iNAV® currencies

For each of the above-mentioned currencies, the iNAV® value in Euro is multiplied with the Refinitiv realtime f/x mid-rate to derive the corresponding iNAV® level in foreign currency. The f/x mid rates are determined as average between BID and ASK. Alternatively, WM fixing rates can be used as well.

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3   YOUR DIRECT LINE TO STOXX

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