



31 May 2007

## **Recommendations Concerning the Method of Calculating Daily CPI and CTI Index Values**

These Recommendations are prompted by the adoption of amendments to Act No. 12/1995, on the Consumer Price Index, and No. 38/2001, on Interest and Indexation, by the most recent session of the Icelandic parliament *Althingi*. The amendments take effect on 1 January 2008 according to parliamentary documents 1295, File 576 and 1356, File 618.

It is a long-established practice in Iceland to use the Consumer Price Index (CPI) and Credit Terms Index (CTI) published by Statistics Iceland on the 10th-15th day of each month to calculate daily index values for the remaining days of the month in question. The daily index determines the index adjustment of indexed bonds. From the first day of each month until the publication of a new index value, market participants have made use of the Central Bank's short-term forecast in determining the daily index. The calculation has been based on a non-linear interpolation, whether based on the CPI as published by Statistics Iceland or the CB's short-term forecast.

This methodology has proved to be difficult for foreign parties to comprehend, since neither the use of forecast values nor of non-linear interpolation has any parallel on other bond markets where indexed bonds are listed. As shown in Table 1, most developed bond markets use exclusively published index values to calculate daily indexes. Furthermore, linear interpolation of lagged values is generally used in calculations. This methodology ensures that only known parameters are used which can easily be acquired in good time to make calculations. For the sake of information, it is worth pointing out that where accumulated indexation is calculated using linear interpolation, the accumulated interest is also calculated on a linear basis.

OMX Nordic Exchange in Iceland (the Exchange) has decided, following a review process, to recommend to market participants and issuers of listed bonds that their calculations of the daily indexes follow the recommendations below. For more information, please contact Brynjar Orn Olafsson ([brynjar.olafsson@omxgroup.com](mailto:brynjar.olafsson@omxgroup.com), tel. +354 525-2856) or Finnbogi Rafn Jonsson ([finnbogi.jonsson@omxgroup.com](mailto:finnbogi.jonsson@omxgroup.com), tel. +354 525-2852).

### **Recommendation No. 1: Linear interpolation, using a two-month lag**

As provided for in Article 1 of Document 1295, File 576, Statistics Iceland is to calculate the CPI for each month, based on the price level during about one week at mid-month each month. Document 854, File 576 states: "... the CPI is [to be] published no later than the penultimate day of each month." Article 1 of Document 1356, File 618 states: "... the index calculated and published for a specific month shall apply to the indexation of savings and loans as of the first day of the second month following." Furthermore, subparagraph b of Article 2 states: "... the index calculated and published in January 2008, based on price data and the price level at mid-January shall apply to the indexation of savings and loans in March 2008." Taking these amendments, and common practice on leading markets abroad

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into consideration, OMX Nordic Exchange in Iceland recommends that, as of 1 March 2008, issuers and other market participants use a linear interpolation in calculating daily index values based on CPI and CTI values published by Statistics Iceland with a two-month lag. This method is shown in the following equation<sup>1</sup>:

$$CPI_d^* = CPI_{M-2} + \left[ \frac{(d-1)}{D} \cdot (CPI_{M-1} - CPI_{M-2}) \right],$$

where

$d$ : the date of settlement (day in month),

$M$ : the month in which  $d$  occurs,

$D$ : the number of days in the month  $M$ ,

$CPI_d^*$ : the daily index on day  $d$ ,

$CPI_{M-1}$ : the CPI published by Statistics Iceland in the month preceding month  $M$ .

**Recommendation No. 2: The daily index on the date of issue and maturity date shall be used**

Unlike the most common practice on leading overseas bond markets, it is common practice in Iceland for the base index value for indexed bonds to be determined exclusively by the index value published by Statistics Iceland for the month of issue, regardless of what date within that month the bond is issued. This is contrary to the methodology applied on the largest indexed bond markets abroad, e.g. in the US, the UK, France, Italy, Canada, South Africa and Germany, where the value of the base index is determined by the calculated daily index for the initial issue's settlement date. The Exchange recommends that issuers use the calculated daily index on the date of issue to determine the base index and that of the maturity date to determine the indexation adjustment. The same methodology and equation explained above shall be used, with  $d$  in this case representing the settlement date of the first issue or maturity date.

**Table 1. Method used in calculating daily indexes in various states**

State	Type of interpolation	Time lag (months)
Australia	Not applicable.	See <sup>Δ</sup>
Canada	linear	3
France	linear	3
Germany	linear	3
Greece	linear	3
Hungary	linear	2
<i>Iceland</i>	<i>linear</i>	2*
Italy	linear	3
New Zealand	Not applicable.	See <sup>Δ</sup>
South Africa	linear	4
Sweden	linear	3
UK	linear	3
US	linear	3

\* As provided for in these Recommendations.

<sup>Δ</sup> Average two-quarter CPI change (%) two quarters prior to the quarter when the next interest payment is due.

<sup>1</sup> The variables  $d$  and  $D$  are defined by the proper day count convention.

### Comments on these Recommendations

- a. Upon the entry into force of amendments to the above Acts No. 12/1995 and 38/2001, Recommendations Concerning the Calculation of Daily Indexes, published on 30 November 2005, will no longer apply.
- b. Recommendations on the Number of Decimal Places in the Daily Index, which were published on 9 January this year will still be fully applicable.<sup>2</sup>
- c. The Exchange will publish the calculated values for the daily indexes.

### Sources:

Bundesrepublik Deutschland Finanzagentur GmbH, *Terms and Conditions of the Bonds 1.50% Inflation-linked Bonds of the Federal Republic of Germany of 2006 (2016)*, ([http://www.deutsche-finanzagentur.de/cln\\_048/nn\\_105612/EN/InstitutionalInvestors/Products/terms\\_and\\_conditions\\_inflation-linked\\_bond.templateId=raw.property=publicationFile.pdf/terms\\_and\\_conditions\\_inflation-linked\\_bond.pdf](http://www.deutsche-finanzagentur.de/cln_048/nn_105612/EN/InstitutionalInvestors/Products/terms_and_conditions_inflation-linked_bond.templateId=raw.property=publicationFile.pdf/terms_and_conditions_inflation-linked_bond.pdf) ).

Deacon, M., Derry, A. and Mirfendereski, D., *Inflation indexed securities: Bonds, Swaps & Other Derivatives* (England: John Wiley & Sons, 2004).

Dipartimento del Tesoro, *Italian Treasury Bond Indexed to Eurozone Inflation (“BTP€i Notes”)* (<http://www.dt.mef.gov.it/ENGLISH-VE/Public-Deb/Treasury-S/INDEX-LINKED-BTP--eng-.pdf>).

Raffaelli, Mark (Bond Exchange of South Africa), *Pricing Methodology for Inflation Linked Bonds* ([http://www.bondexchange.co.za/besa/action/media/downloadFile?media\\_fileid=3785](http://www.bondexchange.co.za/besa/action/media/downloadFile?media_fileid=3785) ).

United Kingdom Debt Management Office, *Formulae for Calculating Gilt Prices from Yields* (<http://www.dmo.gov.uk/documentview.aspx?docname=giltmarket/formulae/yldeqns.pdf&page=Gilts/Formulae> ).

Document 854, File 576 (Submitted to the 133 legislative session of the Icelandic Althingi 2006-2007), *Frumvarp til laga um breyting á lögum um vísitölu neysluverðs, nr. 12/1995* (Bill amending the Act on a Consumer Price Index, No. 12/1995).

Document 918, File 618 (Submitted to the 133rd legislative session of the Icelandic Althingi 2006-2007), *Frumvarp til laga um breyting á lögum um vexti og verðtryggingu, nr. 38/2001, með síðari breytingum* (Bill amending the Act on Interest and Indexation, No. 38/2001, as subsequently amended).

Document 1295, File 576 (Submitted to the 133rd Legislative Session of the Althingi 2006-2007), Act No. 27/2007.

Document 1356, File 618 (Submitted to the 133rd Legislative Session of the Althingi 2006-2007), Act No. 57/2007.

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<sup>2</sup> The Exchange recommends that market participants use five decimal places in calculating the daily CPI and CTI index used for indexation.