IDkA – Methodology

ANBIMA Constant Duration Index

December Version – 2023

Previous version: October-2021

Current version: December-2023

Changes: Inclusion of items 7 and 8, on page 8.
Inclusion of Versions History, on page 9.
On page 10, executive board updated.
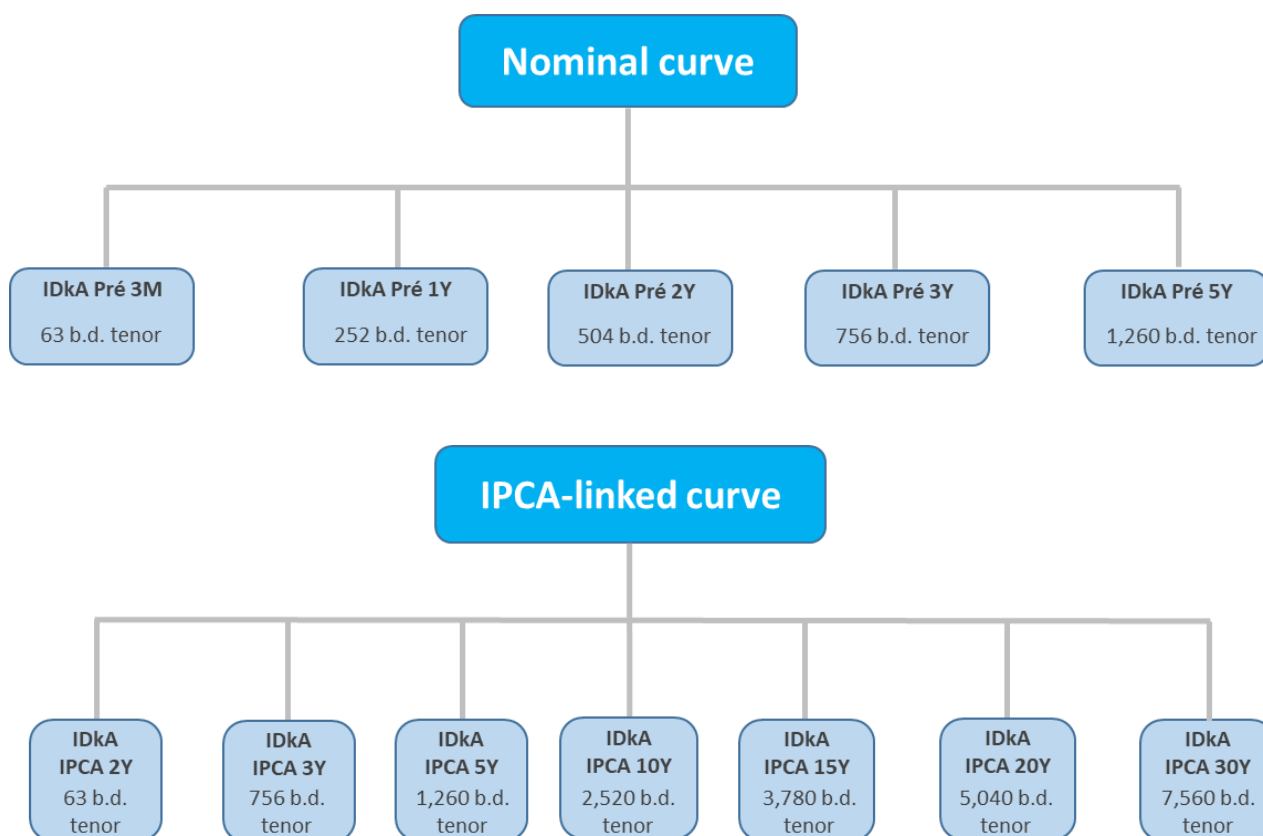No changes in calculation methodology.

Summary

1 – What is IDkA – ANBIMA Constant Duration Index

IDkA – ANBIMA Constant Duration Index (*Índice de Duração Constante ANBIMA*) – is a set of indexes that measure the behavior of synthetic portfolios of government bonds with constant duration. The benchmarks track returns of given maturities in the nominal and IPCA-linked (inflation-linked) Interest Rates Term Structures (*Estrutura a Termo da Taxa de Juros*, aka. ETTJ), published by ANBIMA. Such Term Structures make use of government bonds secondary market indicative rates calculated by ANBIMA.

As they represent gains and losses arising from movements of zero-coupon curves, they constitute new tools for strategy diversification and reference for investors who seek to adequate their portfolios to specific durations in order to match their liabilities.

For the fixed rate segment, five indexes with different durations are disclosed: 3 months (63 business days); 1 year (252 business days); 2 years (504 business days); 3 years (756 business days); and 5 years (1,260 business days). In turn, for the IPCA-linked segment, there are seven different indexes: 2 years (504 business days); 3 years (756 business days); 5 years (1,260 business days); 10 years (2,520 business days); 15 years (3,780 business days); 20 years (5,040 business days); and 30 years (7,560 business days).

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                         ┌──────────────────┐
                         │  Nominal curve   │
                         └──────────────────┘
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IDkA Pré 3M	IDkA Pré 1Y	IDkA Pré 2Y	IDkA Pré 3Y	IDkA Pré 5Y
63 b.d. tenor	252 b.d. tenor	504 b.d. tenor	756 b.d. tenor	1,260 b.d. tenor

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                         ┌──────────────────┐
                         │ IPCA-linked curve│
                         └──────────────────┘
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IDkA IPCA 2Y	IDkA IPCA 3Y	IDkA IPCA 5Y	IDkA IPCA 10Y	IDkA IPCA 15Y	IDkA IPCA 20Y	IDkA IPCA 30Y
63 b.d. tenor	756 b.d. tenor	1,260 b.d. tenor	2,520 b.d. tenor	3,780 b.d. tenor	5,040 b.d. tenor	7,560 b.d. tenor

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2 - Dataset

IDkA is a product of selected Interest Rates Term Structure maturities. ANBIMA carries out the estimation of these curves, using as input indicative rates of fixed rate and IPCA-linked government bonds priced by the Association. The data is available at http://www.anbima.com.br/pt_br/informar/curvas-de-juros-fechamento.htm

The index backfilled to the beginning of 2006, with base-date December 30th 2005 and index number equal to 1,000.00.

3 – Index daily calculation

The constant duration indexes track the performance of an initial 1,000.00 monetary units notional application, reinvested daily at the same tenor of a given Term Structure. On date t, the n-day IDkA replicates an investment made at the corresponding term of the prevailing yield curve. On the following day (t+1), the investment is redeemed at the interest rate associated with the n -1 maturity of the new curve. Then, the proceedings are reinvested at the n-day interest rate extracted from the t+1 term structure.

This procedure is carried out daily, measuring, therefore, the performance of a synthetic portfolio, impacted by movements of the interest rates curves.

For indexes derived from the IPCA-linked zero-coupon curve, the results are compounded by an Updated Nominal Value (VNA) overnight factor. The procedure is analogous to the monetary adjustment of linkers (NTN-B). Specifically, either the daily variation of the IPCA accumulation factor disclosed by IBGE (*Instituto Brasileiro de Geografia e Estatística*), or the inflation projection gathered by ANBIMA's Macroeconomic Committee, is accrued to the IDkA.

4 – Events that can interfere at the index daily calculation

The index will not undergo any kind of recalculation, but those related to operational or human errors.

5 – Disclosure

Indexes results and their statistics are disclosed daily after estimation of ETTJ parameters, which is usually available after 19hs (BRT).

6 – Disclaimer / Liability Exemption

IDkA's disclosure has a merely informative purpose and its use by economic agents is optional. ANBIMA does not take responsibility for eventual damages or losses that might arise to users employing its indexes with any purpose and, in this case, the latter assume entire and exclusive responsibility.

Appendix - Mathematical Formulas

1 – Index number calculation

1.1 IDkA index number for fixed rate segment

Acknowledging that: $I_0^{PRÉ} = 1.000,000000$

$$I_t^{PRÉ} = I_{t-1}^{PRÉ} \; x \; \frac{\left(\frac{TaxaPréETTJ_{t-1}^n}{100} + 1\right)^{\frac{n}{252}}}{\left(\frac{TaxaPréETTJ_t^{n-1}}{100} + 1\right)^{\frac{n-1}{252}}}$$

Where:

n is the maturity or term of ETTJ, in business days;

$TaxaPréETTJ_t^n$ is the yield, in % per year, of the maturity or term n of the fixed rate ETTJ calculated by ANBIMA at date t;

$I_t^{PRÉ}$ is IDkA index number[1] on date t.

1.2 IDkA index number for IPCA segment

Acknowledging that: $I_0^{IPCA} = 1.000,000000$

$$I_t^{IPCA} = I_{t-1}^{IPCA} \; x \; \left\{ \left[\frac{\left(\frac{TaxaIPCAETTJ_{t-1}^n}{100} + 1\right)^{\frac{n}{252}}}{\left(\frac{TaxaIPCAETTJ_t^{n-1}}{100} + 1\right)^{\frac{n-1}{252}}} \right] x \left(\frac{VNA_t^{NTN-B}}{VNA_{t-1}^{NTN-B}} \right) \right\}$$

Where:

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[1] Index number results are published truncated at the 6th decimal place.

n is the maturity or term of ETTJ, in business days;

$TaxaIPCAETTJ_t^n$ is the yield, in % per year, of the maturity or term n of the IPCA-linked ETTJ calculated by ANBIMA at date t;

I_t^{IPCA} is IDkA index number[2] on date t;

VNA_t^{NTN-B} is date t NTN-B inflation-adjusted principal, with base-date July 15th 2000.

2 – Formulae for IDkA daily calculation

1.1 IDkA daily variation

$$Var\%IDkA_t = \left[\left(\frac{I_t}{I_{t-1}}\right) - 1\right] x100$$

Where:

$Var\%IDkA_t$ is IDkA daily variation on date t, expressed as a percentage;

I_t is IDkA index number on date t;

I_{t-1} is IDkA index number on date $t-1$.

1.2 IDkA volatility

$$Vol_t = \sqrt{\frac{\sum(Var\%_t - \overline{Var\%})^2}{(x-1)}} \, x \, \sqrt{252}$$

Where:

Vol_t is IDkA annualized volatility on date t;

$Var\%_t$ is IDkA daily return on date t;

$\overline{Var\%}$ is IDkA average daily returns over the analysis window;

x is the number of days within the analysis window[3].

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[2] See note 1.
[3] A 21-day rolling window is used for calculating IDkA daily volatility.

7. Periodic Review

The composition of the theoretical portfolios is reviewed monthly, capturing on such occasions the changes that occurred in stocks of securities on the market, in order to preserve the representativeness of the indicator. In addition, ANBIMA relies on the Benchmark Subcommittee to carry out extraordinary revisions, in case market movements that directly affect the indices are allowed, or changes in the methodology are suggested. Any changes made to the indices and methodologies are published on ANBIMA's institutional website and announced at least 120 days in advance, as provided for in the methodology.

8. Final Considerations

Unforeseen cases in the methodology will be evaluated by the responsible bodies.

On occasions when changes to preserve the index require immediate action, the procedures to be adopted can be evaluated and approved by restricted groups of members of the responsible bodies. In such cases, the assessment must be made by at least five representatives of the Benchmarks Subcommittee and approved by at least three representatives of the Pricing Committee (preferably including the president and vice president of the forum).

All decisions are disclosed through the Association's communication channels.

Versions History:

Version: November-2013

Version: October-2021

Changes: Only textual and layout changes. No changes in calculation methodology.

IDkA (ANBIMA Constant Duration Index)

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