



*ANDIMA'S Brazilian
Government Bonds Guide:
Characteristics, Pricing and
Calculating Methodology
(February 2007)*

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Section I – Pricing Methodology of Government Bonds

1 – Introduction and Brief Institutional Background

The discussion on pricing of financial assets attained great relevance in 2002, with the effectiveness of the rules making compulsory the market listing of assets composing the portfolio of the several portfolio types administered or maintained by financial institutions, investment fund managements, pension funds, insurance companies, etc. For the ANDIMA, always concerned with the development of the secondary market of fixed income securities, this subject is already included in their priorities since 2000, which has strongly contributed to the adaptation of the accounting standards to those found internationally.

The beginning of the work for pricing the financial assets began in November 1999, when the Central Bank and the National Treasury delegated to ANDIMA the task of disclosing rate parameters for government bonds negotiated at the secondary market.

The next step was setting up a sample of notifiers that became responsible for delivering the rates daily to the Association, and that was originally constituted by the financial institutions more active in the secondary market of government bonds. In this context, in addition to the open market dealers, other institutions standing out in that segment were also indicated by the Bank Central. Later, a group of asset managers was included in the sample, besides a group of financial middlemen, specialized in the brokerage of public bonds.

These institutions form the ANDIMA price makers, a sub-group of which is organized as the Assets Pricing Committee of the Association that, on its turn, is a forum gathering every month basically to propose improvements to the process of ascertaining the average rates. Every changes in the project are, therefore, discussed and approved in that instance.

In order to minimizing the work of the institutions and possibilities of typing mistakes, the Association developed a price calculation system which, with the technological support of RTM – Market Telecommunications Network, allows the automatic transmission of data concerning the government bonds, also making possible a quick feedback of the addressed rates for the participants.

For evaluation of the quality and assiduity of the information sent daily to the association, it was created a system that allows ranking the sample institutions for a time interval comprised of every civil month. This work is intended to improve the disclosed rates, classify the notifiers and to identify punctual maladjustments in the sent rates. A report is produced and sent to the Committee representatives, which allows following up each institution with regard to its contribution to the daily calculations.

Another instrument derived from the standardization work for public bonds calculation was the release of CHECKING, the electronic calculator that provides the key information on the primary auctions of the National Treasury and the Central Bank and the negotiations in the secondary market, in addition to the modalities of rediscount operations of the Central Bank. This tool helps to explain doubts concerning the operations with these papers because it complies with the calculation and negotiation standards provided for in the legislation in force.

The transparency and liquidity of the fixed income market has been the subject of dispute in the international context. In Brazil, although the businesses registration is obligatorily carried out in central receivers (Selic and Cetip), the securities characteristics and distributions of the government segment issuances still generate low businesses volume in the secondary market, which are concentrated in a few vertex points. In methodological terms, the best pricing information would be that originated in the very negotiations conducted between the market players and recorded in electronic systems. The reality of the Brazilian secondary market, however, takes away this possibility, at least temporarily.

In the case of government bonds, the information from the universe of operations registered with the SELIC, disclosed by the Central Bank one day later, shown that a good portion of the proceeds of marketed securities (included only LTN, NTN-D, LFT, NTN-C, NTN-B and NTN-F) presents extremely reduced daily number of businesses and frequently count not even a single business. In such context, the methodological solution found by ANDIMA for the reduced liquidity problem was the creation of a sample of notifiers - as described above - that daily send to the Association information of two different natures: Maximum and Minimum Rates representing the spreads practiced and/or observed along the day; and Indicative Rates which refer to the rates appraised by the institution as fair business price for each expiration, according to the individual curves, irrespective of having happened business with the paper.

In practice, as the number of businesses is small and dispersed among the several expiration dates, the Maximum and Minimum Rates information – which would reflect transactions or spreads open along of the day – reaching ANDIMA are not enough to ascertain the rates for all the securities and their respective expiration dates. For the Indicative Rates column, on the other hand, the volume of sent information and the average rates calculation methodology (see ahead) cause the pricing of most of the proceeds. Although these are synthetic prices - in the sense of not reflecting the businesses actually carried out -, the ex-post comparisons with the effectively practiced rates expose a strong agreement between both information, specially for those expiration dates in which the registration numbers with the SELIC is more significant.

The inclusion of the financial asset pricing project at the COM attempts to consolidate hereunder a practice and procedure standard adopted by the participants in the fixed income market with regard to the negotiation forms and registration in over the counter operations with government bonds.

2 – Definitions and ascertaining methodology of the average rates

2.1 - Main concepts

The information should to be sent as rates, as the system was set up so that, in the case of prefixed and linked to price indexes bonds (IGP-M and IPCA), the expression is in annual format, base 252 business days; for exchange securities, in annual nominal rate format, 30/360 convention; for post-fixed securities, profitability as average rate per year, base 252 business days; and for “swapped” exchange securities, in DI percentage.

The rates required for the above mentioned securities have two natures:

- a) **Maximum and Minimum:** spreads practiced and/or observed along the day;
- b) **Indicatives:** Rates appraised by the institution as fair business price baseline for each expiration date, according to their individual curves, irrespective of business occurrence

or even that the securities had been quoted in the secondary market during the day. The latter should be calculated after the closing of the market.

Some conventions were adopted in order to standardize the sending of the information and the average rate calculation. These are:

a. Spot Dollar:

The spot dollar used by the institution in the baseline day for calculation of the “dirty” coupon should be sent to ANDIMA, which based on such information calculates the “clean” rates for each institution for the column relative to the Indicative Rate. The results of such calculation are submitted to the screens described below. After definition of the average rates, the calculation of the dirty coupon is carried out, based on the ascertained average dollar based on the individual rates of the institutions. To calculate the average dollar, the observations whose dispersion in relation to the median exceeds two standard deviation of the sample are excluded. The calculations made by ANDIMA to achieve the “clean” rates are described in the end of this document.

b. IGP-M and IPCA Estimates:

Aiming at reaching an agreement and facilitating negotiation of the securities in the secondary market, the Association informs at each IGP-M (polls and final index) and the IPCA (final index) disclosure, at the RTM and on Internet, an average of the index projections for the month, determined with the members of the Macroeconomic Follow up Committee of the Association. This information is sent daily through the system to the participants of the sample.

c. LTN Rates and Exchange Securities:

Also aiming at standardization and compatibility of the received information, it was agreed in the sphere of action of the Assets Pricing Committee that the LTN rates and securities linked to the dollar should take into account the closing of future interests markets, adding the built-in premiums for negotiations in the public securities segment.

d. Time:

The time limit to receive the rates is 06:00 pm. This ceiling was established after consultation with several institutions and serves two purposes:

a) to allow the participants time for calculating their curves according to the closing of markets; and b) to assure a minimum time for ANDIMA to calculate and send the average rates to the system holders, as well as to the other disclosure means, on a timely basis to attend the several areas of each potential user institution of that information. The Association discloses the information on the publication up to 08:00 pm, except in exceptional cases.

2.2 - Average Rate Calculation

a) Introduction

The following described methodology, elaborated with the help of Gyorgy Varga, doctor in economy by the EPGE/FGV and consultant by the FCE, is divided in three parts:

The first part is intent on eliminating remarks that might be wrong and contaminate the average calculation. It is important to note that this is cross section of a financial series and

that more than a price in the same moment for the same asset is pointless, since if such is the case, it is possible to arbitrage among the several price suppliers. As this is a small liquidity market, the main concern will be to eliminate willfully or inadvertently supplied mistaken information.

The second part address calculation of the average rate, based on the remaining notes not eliminated by the statistical screens. The third part refers to the treatment aiming at the disclosure of rates for expiration dates lacking information or, also, where the dispersion leads to lack of agreement on an average, according to the presented methodology. For these cases, it was opted for the interpolation, using the Cubic Spline₂ method, except for the LFT, wherein the exponential interpolation is used. In the case of LTNs, the extrapolation criterion is used, based on the forward rate between the last two available expiration dates (see herein below).

Several problems could cause errors on the data supplied, e.g.:

- typing;
- rate format;
- incorrect time at the data generation;
- attempt to manipulate rates.

Two types of data can be used to eliminate the mistakes: those directly supplied by the financial institutions and those obtained with external sources (BM&F, CETIP etc.). The data supplied by the institutions will be submitted to two screens, enough for ascertaining the average rate. Since the sample size is small, we used the t distribution to evaluate the average estimate for the indicative rates. The contemporary deviation - that is, that relative to the current day - is impacted by the potentially mistaken data received in the same period. Therefore, a first elimination of spurious rates will be conducted based on the comparison between the deviation of each observation and the arbitrated average deviation. The statistics obtained with other sources in the financial market, on the other hand, form a third external screen, to identify information that are too distorted in relation to the market rates for equivalent assets. This screen will work as a curve management tool, not being actually used to exclude information.

A fourth managerial screen is applied to each participant's individual information, comparing it with the median of the information received for each maturity date. The purpose of such procedure is to indicate to the ANDIMA technicians the institutions participant in the sample that are slow in adjusting their curves in periods of volatility of the assets and financial instruments.

b) Internal Screens

b.1) Screen 1

This method allows obtaining forward rates for intermediate periods, smoother than those obtained by the capitalization procedure of the forward rates themselves. The first internal screen will eliminate remarks whose absolute median deviation exceeds a deviation ascertained by multiplying a standard variation coefficient (a) by the median of the rates received in the day, so long as this deviation is not smaller than a previously ascertained minimum absolute value (b). This minimum value should vary according with the absolute magnitudes of the rates practiced in each conjuncture.

Thus:

$dr_t^i = (r_t - \mu_r)$ = absolute deviation from the remark i , the rate r in the day t . With a procedure similar to that adopted by Vasicek and Fong (1982), eliminate the remarks i that include:

$$|dr_t^i| > \text{Maximum} \{a\mu_t, b\}$$

The a parameter value is fixed on 10% and the parameter b is fixed on 0.5 percentile points, which can be changed whenever the tests show any significant change in the pricing standard of a certain assets. The information not eliminated in this screen will be used for calculation of the averages of the Maximum and Minimum Rates. In the case of the Indicative Rates, the resulting remarks will be according to a new procedure (screen 2), provided that at least three remarks remain.

b.2) Screen 2

This procedure will eliminate all remarks not fitting a certain trust interval, as shown below:

$$- \frac{t\sigma}{\sqrt{n}} < |dr_t^i| < \frac{t\sigma}{\sqrt{n}}$$

The trust interval will depend on the volatility of the rates daily observed for each expiration date. Consequently, if the volatility of the current day interest rate exceeds one and a half times the previous days volatility average, i.e., if

$|r_t - r_{t-1}| > \text{Average} \{r_i - r_{i-1}\}_{i=t-1, t-4} \times 1,5$ it is then acceptable to assume that the volatility of the supplied rates should increase. In such case, the validation interval of the rates will be less conservative, i.e., the parameters used for the t distribution will be those generating a 97.5% trust degree interval.

Inversely, in case of volatility decrease in the current day interest rate, i.e.:

$$|r_t - r_{t-1}| \leq \text{Average} \{r_i - r_{i-1}\}_{i=t-1, t-4} \times 1,5$$

The screen strictness is increased, using parameters for t distribution that generate a 95% trust degree interval from the screen 2.

n

The information for the Indicative Rates not excluded in this screen will be added and a simple average will be ascertained and disclosed for each expiration date.

c) Managerial Screen

The Managerial Screen is set up based on information from derivative markets susceptible to arbitration with the government bonds market. The basic hypothesis is that under normal market conditions the public securities curves and those of the derivative markets should present similar behaviors given a level of spread expected among these markets. Therefore, the comparison between these curves can work as an important evaluation mechanism for the

consistency of the Indicative Rates ascertained by the Association for each one of the priced government bonds.

d) Calculation of Average Rates

After the tests are performed, ascertainment of the average rates will be according to the following criteria:

Indicative Rate: The simple arithmetic average is calculated with the information not eliminated by screens 1 and 2;

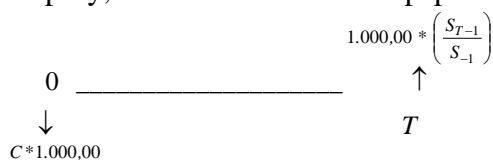
Maximum and Minimum Rates: The average rates are calculated with the information exceeding the screen 1;

2.3. Clean Return x Dirty Return for Exchange Securities

The above exchange variation return paid by the NTN-D/NBC-E is based on the exchange rate with one-day delay at the input and output.

Consequently, it is as if an exchange variation change was being carried out between the security maturity date and the previous date thereof, against the variation of the day previous to the purchase with regards to the purchase day. This difference between the exchange rate based on which the title begins to be readjusted and the current exchange rate results in an important distinction in its financial clearance, which is the clean price and dirty price thereof. The clean price includes the current quotation of the exchange rate instead of the previous day quotation, as mentioned in this title specification.

To exemplify, is worthwhile to take a paper without intermediate payments. Its cash flow will be:



Note: As from 1/Sept/2000, the exchange bonds rates are expressed as nominal rates. Therefore, the **IRR - Internal Return Rate** – is obtained as follows:

$$IRR = \left(\frac{\text{nominal rate}}{200} + 1 \right)^2 - 1$$

Note 2: The T term is obtained based on the 30/360 convention.

It happens that the effective exchange variation is $\frac{S_T}{S_0}$, therefore the actual return (rl) exceeding the exchange variation, also called a clean coupon, is

$$rl = \left[\frac{S_{T-1}/S_{-1}}{C \left(\frac{S_T}{S_0} \right)} \right]^{\left(\frac{360}{T} \right)} - 1 = \left[\frac{1}{C} \frac{S_0/S_{-1}}{S_T/S_{T-1}} \right]^{\left(\frac{360}{T} \right)} - 1.$$

The future exchange variation used to be taken as zero (since it can both increase or decrease), therefore the clean coupon can be simplified to

$$rl = \left[\frac{1}{C} \frac{S_0}{S_{-1}} \right] \left(\frac{360}{T} \right)_{-1}$$

and the return, without taking this adjustment into account, referred to as dirty coupon, is

$$rs = \left[\frac{1}{C} \right] \left(\frac{360}{T} \right)_{-1}.$$

The ratio between the dirty and the clean coupons is

$$rl = \left[(1 + rs) \left(\frac{T}{360} \right) \frac{S_0}{S_{-1}} \right] \left(\frac{360}{T} \right)_{-1} - 1.$$

The nominal clean rate results from the expression:

$$\text{Nominal rate} = \left[\left(\frac{\text{Clean - coupon}}{100} + 1 \right)^{1/2} - 1 \right] \times 200$$

2.4 - Rate Interpolation

Priced vertexes - After applying the above described criteria and in view of the possibility that the received the number of information may not allow rate disclosure for some maturities dates, it was decided in these cases, to interpolate the series, using therefor the Cubic Spline method for the prefixed and exchange bonds, and the forward rate capitalization method, for the post-fixed bonds, linked to the Over Rate SELIC. It should also be noticed that the NTN-C, NTN-B and the swapped exchanges are not subject to interpolation. Using the Spline allows obtaining forward rates for intermediate periods, smoother than those obtained by the capitalization procedure of the forward rates themselves. The Spline is applied and interpolated between all the supplied rates, so that the curve crosses all the available rates. The LFT peculiarity makes the forward rate capitalization method more suitable. In the case of the prefixed securities without intermediate payments (LTN), the first vertex is always that for one-day period, and it is used to calculate the rate ascertained by the ANDIMA for government bonds, such as proxy. This rate will always be used to calculate the interpolation, regardless of a LTN maturity date also occurring with a one-day period. As for the exchange applications, the Spline is used on the clean coupon denominated curve. The dirty coupon denominated curve is extremely unstable, due to differences in the exchange rate at the moment of negotiation of the paper and the writ thereof.

Further details on the application of the Cubic Spline method can be obtained in numeric analysis books, such as **Cheney and Kincaid** (1996), Chapter 6. An application to the Brazilian interest rate market, including an algorithm for *Cspline* implementation can be obtained in **Varga** (2000).

2.5 - Extrapolation by the LTN forward rate (as from 1/Sept/2000)

In case the rates for the last maturity date(s) of the National Treasury Bills (LTN) are not disclosed (if such information is not screened out by the above described screens), the rate extrapolation criterion, based on the forward rate built in the last two priced maturities dates was opted for.

$$TT = \left(\frac{UP1}{UP2} \right)^{\frac{1}{du1}}$$

$$\text{Extrapolated rate} = \left\{ \left[\frac{1000}{\left(\frac{UP2}{TT^{du2}} \right)} \right]^{252/du3} - 1 \right\} \times 100$$

Where:

TT = Forward rate between maturity dates;

PU1 = Unit price of the penultimate priced/ interpolated maturity date;

PU2 = Unit price of the last priced maturity date;

du1 = business days between the penultimate and last priced maturity dates;

du2 = business days between the maturity date to be extrapolated and the last priced expiration date;

du3 = total business days from the maturity date to be extrapolated (baseline day to the expiration dates, excluded).

2.6 - Communication and Safety

The institutions participating in the sample and the Central Bank are linked to ANDIMA through RTM - Market Telecommunications Network. The ascertained and calculated rates can be quickly and safely sent and received through the RTM. The intranet at the institutions must be prepared to send and receive data to and from ANDIMA. This implies in releasing the data flow through the firewall of the providing institution (if any). The safety is guaranteed by data cryptography, based on employing a private random key. Institutions without access to the RTM can send the rates by e-mail (getec@andima.com.br).

Further explanations can be obtained on the phone (21) 3814-3801.

2.7 - Bibliographic References

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SHEA, G. Interest rate term structure estimation with exponential splines: a note. Journal of Finance, [s.l.], n. 40, p. 319-325.

VARGA, Gyorgy. Interpolação por Cubic Spline para a estrutura a termo brasileira. [on line]. [mentioned in January 2000]. Available on the Internet: < www.fce.com.br/gv.>.

VASICEK, O., FONG, G. Term structure modelling using exponential splines. Journal of Finance, [s.l.], n.37, p 339-348.

Section II - Methodology used to calculate the Main Government Bonds in the Market

This paper covers the methodology used to calculate federal government bonds and its main purpose is to standardize the ways of calculating and expressing the interest rates adopted by the Brazilian National Treasury and the Brazilian Central Bank in relation to government securities being held by the public.

This study deals with the ways of expressing and calculating federal government bonds placed on the market via primary selling auctions. This paper covers both the aspects related to the primary auctions as well as trading in these securities on the secondary market.

With regard to the assets referenced in Reais – namely LTNs, NTN-Fs, LFTs, NTN-Cs and NTN-Bs, the way of expressing the interest rates was standardized in an effective annual rate based on 252 business days. In the case of asset that are indexed to the FX rate – namely NTN-Ds – the total of 360 days prevails, and intermediate coupons of interest payments are calculated in a linear manner.

1 – LTN – National Treasury Bills

1.1 - Characteristics

Issuer: Brazilian National Treasury Department.

Type of Profitability: Fixed Rate

Term: Set by the Finance Minister, at the time the security is issued.

Interest: There is no interest.

Type: Book-entry system, nominative and negotiable.

Form of Placement: Public offering.

Updating of the Face value: There is no updating of the face value.

Payment of Interest: There is no payment of interest.

Redemption of the Principal: At the date of maturity.

Face value at Maturity: R\$ 1,000.00

1.2 – General Trading Considerations in the Secondary Market

- For trading purposes, the rate used is the effective annual rate, based on 252 business days, with up to four decimal places.
- For trading purposes, it is only taken into account the term, in business days, from when the security was first issued.
- At a later date, the operation will be registered in SELIC (Special System for Settlement and Custody) in the form of a UP with six decimal places.

1.3 – Calculation Formula

- **Calculation of the effective annual Rate based on the UP:**

$$Rate = \left(\left[\frac{NV}{UP} \right]^{\frac{252}{bd}} - 1 \right) \times 100$$

Rate = Effective annual rate.
NV = Nominal redemption value.
UP = Unit price.
bd = Business days from the settlement date (including) to the date of maturity (excluding).

Calculation of the UP based on the effective annual Rate:

$$UP = \frac{NV}{\left[\left(\frac{Rate}{100} + 1 \right) \right]^{\frac{bd}{252}}}$$

Rate = Effective annual rate.
NV = Nominal value.
UP = Unit price.
bd = Business days from the settlement date (including) to the date of maturity (excluding).

Primary Auction of LTN (National Treasury Bills)

Based on the UP (unit price) disclosed by the Central Bank.

1) With average UP already disclosed by the Central Bank following the auction.

Redemption Value	Average UP	Issue Date	Settlement	Redemption	Total Days	Bus.Days
1.000	708,632960	01/25/06	01/25/06	07/01/08	888	605

nb: Bill's number of business days = Date of Settlement to Maturity

2) With the minimum UP already disclosed by the Central Bank following the auction.

Redemption Value	Minimum UP	Issue Date	Settlement	Redemption	Total Days	Bus.Days
1.000	708,442100	01/25/06	01/25/06	07/01/08	888	605

nb: Bill's number of business days = Date of Settlement to Maturity

1) Calculation of the Average Over Rate:

X = Discount factor of the price obtained

$$X = \frac{\text{Redemption Value (Face)}}{\text{Average UP}}$$

$$X = \frac{1.000,00}{708,632960}$$

$$X = 1,4111677785916100$$

Y = Factor of one over.

Y = (Discount factor of the price obtained ^ 1/n° of business days)

$$Y = (1,41116777859161)^{(1/605)}$$

$$Y = 1,0005694473188500$$

Z = Over factor year (252 days)

$$Z = (1,00056944731885)^{252}$$

$$Z = 1,1542605030293100$$

$$Z = ((1,15426050302931)-1)*100$$

Average Over Rate 15,42605030293060
Average Over % p.a 15,426

2) Calculation of the Maximum Over Rate:

X = Discount factor of the price obtained

$$X = \frac{\text{Redemption Value (Face)}}{\text{Minimum UP}}$$

$$X = \frac{1.000,00}{708,442100}$$

$$X = 1,4115479585417100$$

Y = Factor of one over.

Y = (Discount factor of the price obtained ^ 1/n° of business days)

$$Y = (1,41154795854171)^{(1/605)}$$

$$Y = 1,0005698928150700$$

Z = Over factor year (252 days)

$$Z = (1,00056989281507)^{252}$$

$$Z = 1,1543900196273800$$

$$Z = ((1,15439001962738)-1)*100$$

Maximum Over F 15,43900196273850
Maximum over % 15,439

Redemption Value	Issue	Settlement	Redemption	Over average % p.a.	Average UP	Bus.days	Total nbr of days
1.000	01/25/06	01/25/06	07/01/08	15,426	708,632960	605	888
Date of Trade	Bus.days to Mat.	Rate neg. % p.a.	Bus.days year				
02/08/06	595	15,000	252				

nb: Bond's number of business days=Date of settlement to maturity.
Sale of an LTN in the secondary market on 02/08/06:

Rate of trade : 015 % a.a.
From to 02/08/06 to 07/01/08 - 595 business day up to maturity

Trade with Actual Rate/year.

- Calculation of the Unit Price (UP):

$$UP = 1,000 / [((Actual\ annual\ rate/100) + 1)^{(1/252)}]^n$$
, where:
- n = number of business days to redemption
- UP should be round off to the sixth decimal place.

Based on the Actual Rate/year of trade, taking into account the number of business days remaining up to maturity:

Period factor = $[(15,00/100)+1]^{(1/252)^{595}}$
Period factor = 1,39095905249920
UP of trade = 1,000/Period Factor
UP of trade and registration = 718,92842439

2 - NTN-F – National Treasury Notes, Series F

2.1 - Characteristics

Issuer: Brazilian National Treasury.

Type of Profitability: Fixed Rate.

Term: Set by the Finance Minister, at the time the security is issued.

Interest: Set by the issuer at the time of issue, in percentage terms per year.

Type: Book-entry system, nominative and negotiable.

Form of Placement: Public offering.

Updating of the Face value: There is no updating of the face value.

Payment of Interest: Every six months, with adjustment in the first fluency period, when suitable. The first interest coupon to be paid will take into consideration the full rate established for six months, regardless of the security's date of issue.

Redemption of the Principal: At the date of maturity.

Face value at Maturity: R\$ 1,000.00

2.2 – General Trading Considerations in the Secondary Market

- For trading purposes, the rate used is the effective annual rate, based on 252 business days, with up to four decimal places.
- For trading purposes, one only takes into account the term, in business days, of payment of interest and the from date of trading up to date of maturity.
- At a later date, the operation will be registered in SELIC (Special System for Settlement and Custody) in the form of a UP with six decimal places.

2.3 – Calculation Formula

- **Calculation of Interest:**

$$\text{Interest} = \left\{ \left[\left(\frac{i}{100} + 1 \right)^{\frac{6}{12}} \right] - 1 \right\} \times 100$$

Interest = Rate of interest of the coupon in the six months.
i = Rate of interest (% p.a.) set out in the auction notice.

Calculation of the Price based on the effective annual Rate: the price of the operation is the sum of the interest payments and the principal, discounted (brought to present value) using the IRR.

$$Price = \sum_{i=1}^n \frac{\left[\left(\frac{i}{100} + 1 \right)^{\frac{6}{12}} - 1 \right]}{\left[\left(\frac{IRR}{100} + 1 \right)^{\frac{bd_i}{252}} \right]} + \frac{1}{\left[\left(\frac{IRR}{100} + 1 \right)^{\frac{bd_n}{252}} \right]}$$

Price = Price of the security, vis-à-vis the UNV (Updated Nominal Value).
i = Rate of interest (% p.a.) set out in the auction notice.
n = Number of payment flows of the security.
IRR = Internal Rate of Return, corresponds to the effective annual rate.
bd_i = Business days from the settlement date (including) to the interest *i* payment date (excluding).
bd_n = Business days from the settlement date (including) to the maturity date (excluding).

- **Calculation of UP based on the Price:**

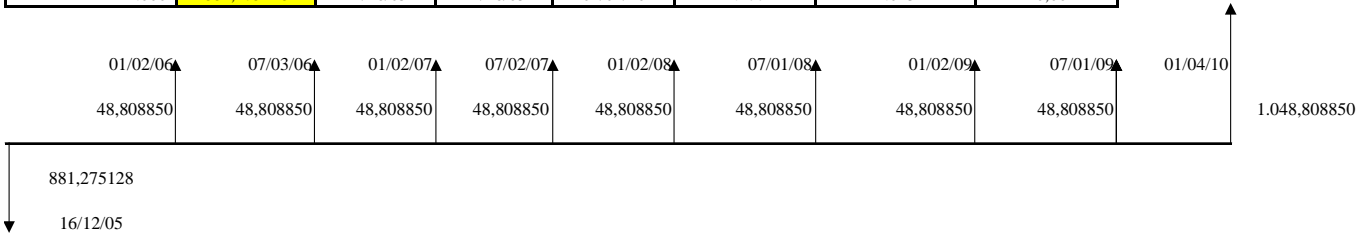
$$UP = Price \times UNV$$

UP = Unit Price.
Price = Price of the Security, in relation to the VNA.
UNV = Updated Nominal Value.

Primary Auction of NTN-F (National Treasury Notes, Series F)

Based on the Single Price disclosed by the Central Bank.

Face Value	Average Price	Issue Date	Settlement	Redemption	Term (days)	Term (bus.days)	Interest % p.a.
1.000	881,275128	12/16/05	12/16/05	01/01/10	1.477	1.013	10,00



1 - Calculation of Annual Interest to % per six months in Price:

$$X = (((010/100)+1)^{(6/12)})-1 * 100$$

$$X = 0,04880885$$

$$\text{Interest (i) UP} = 1000 * 0,04880885$$

$$\text{Interest (i) UP} = 48,808850$$

Redemption Price including the Interest

$$\text{Redemption Price} = 1000 + FJ$$

$$\text{Redemption Price} = 1.048,808850$$

Utilizing Excel to arrive at the Auction's Rate:

	Dates	Days	252 Days	Price/Coupon	Payts. Discounted.
Average Price	12/16/05	--	--	-881,275128	881,275128
Value 1st Int. Instal.	1/2/06	17	11	48,808850	48,493535
Value 2nd Int. Instal.	7/3/06	199	135	48,808850	45,076910
Value 3rd Int. Instal.	1/2/07	382	260	48,808850	41,876324
Value 4th Int. Instal.	7/2/07	563	384	48,808850	38,925916
Value 5th Int. Instal.	1/2/08	747	510	48,808850	36,140767
Value 6th Int. Instal.	7/1/08	928	633	48,808850	33,614260
Value 7th Int. Instal.	1/2/09	1.113	764	48,808850	31,117353
Value 8th Int. Instal.	7/1/09	1.293	886	48,808850	28,959077
Price + six-monthly interest.	1/4/10	1.480	1.014	1.048,808850	577,070987

Sum	558,0045
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IRR Function - Excel	13,803
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From the moment that it is determined that the IRR is equal to 13.803, this rate should be utilized to determine the bond's discounted cash flow.

Utilizing this IRR (13.803), the initial price obtained was one of 937.053054. This was because Excel's IRR function always takes into account, for calculation purposes, six-monthly payments of 180 days. Since this bond is priced in Reais, the discounted cash flow needs to take into account the number of business days between the coupon payments. It will be necessary to set up a discounted cash flow based on the number of business days and then utilize the tool Reach Targets. This tool will find the rate at which, after discounting the interest payments, the NPV obtained will be zero.

IRR - Goal Seek	16,007
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Utilizing Excel's Goal Seek tool, one arrives at an IRR of 16.007. With this rate it is possible to produce the discounted cash flow and arrive at the bond's average price which was one of 881.275128. This will be the value given by the Authority.

The IRR based on 252 business days should be the rate used for the trade on the secondary market.

The calculation method in National Treasury Notes, Series F (NTN-F) secondary market trading, does not differ which was shown in an example related to primary market operations, with the exception of the Updated Nominal Value shown above and the decimal places criterion contained in the table 8 in this document.

3 – LFT – Treasury Financial Bills

3.1 – Characteristics

Issuer: Brazilian National Treasury .

Type of Profitability: Floating Rate (SELIC Rate).

Term: Set by the Finance Minister, at the time the security is issued.

Interest: There is no interest.

Type: Book-entry system, nominative and negotiable.

Form of Placement: Public offering.

Updating of the Face value: Defined by the adjusted average rate of the fundings registered in SELIC, for federal titles.

Payment of Interest: There is no payment of interest.

Redemption of the Principal: At the date of maturity.

Base-Date: Reference date for the updating of the nominal value, which may be a date prior to the issue date.

Nominal Value on the Base-Date: R\$ 1,000.00

3.2 – General Trading Considerations in the Secondary Market

- For trading purposes, the rate used is the profitability per year, based on 252 business days, with up to four decimal places.
- For trading purposes, one only takes into account the term, in business days, from date of trading up to date of maturity.
- At a later date, the operation will be registered in SELIC (Special System for Settlement and Custody) in the form of a UP with six decimal places.
- In order to calculate the updated nominal value (UNV), the start off will be the nominal value (base-date) and this is updated using the cumulative daily SELIC factor.

3.3 – Calculation Formula

- **Calculation of the Profitability (in % p.a.) based on the Price:**

$$\text{Profitability} = \left\{ \left[\left(\frac{100}{\text{Price}} \right)^{\frac{252}{bd}} \right] - 1 \right\} \times 100$$

Profitability = Profitability of the security, expressed in annual terms

Price = Price of the security, in relation to the VNA.

bd = Business days from the settlement date (including) to the maturity date (excluding).

- **Calculation of the Price based on the Profitability (in % p.a.):**

$$Price = \frac{100}{\left(\frac{Profitability}{100} + 1\right)^{\frac{bd}{252}}}$$

Profitability = Profitability of the security, expressed in annual terms
Price = Price of the security, in relation to the VNA.
bd = Business days from the settlement date (including) to the maturity date (excluding).

Calculation of the UP based on the Price:

UP = Unit Price.
Price = Price of the security, in relation to the VNA.
UNV = Updated Nominal Value.

$$UP = Price \times UNV$$

Primary Auction of LFT (Treasury Financial Bills)

Example for the calculation of the average % profitability per year, based on the average price disclosed by the Central Bank.
 *With the Base-Date equal to the settlement date.

Based on the Average Price disclosed by the Central Bank.

Face Value R\$	Final Price	Average Price	Issue Date	Settlement	Redemption	Base-Date	Total nbr of days
1.000	100	99,5464	07/01/00	07/01/00	03/17/10	07/01/00	3.546
						Bus.days year.	Bus.days Bond
						252	2.442

nb: Bill's number of business days = number of business days from Settlement date to maturity.

Average discount factor over face value

X = Discount/increase factor over face value.

$$X = \frac{Final\ Price}{Average\ Price}$$

$$X = \frac{100}{99,5464}$$

$$X = 1,0045566691$$

(AP) Average profitability % p.a. (252 business days)

$$AP\ \% \text{ p.a.} = ((X \wedge (252 / \text{bill's number of business days}) - 1) * 100$$

$$AP\ \% \text{ p.a.} = (1,0045566691 \wedge (252/2442) - 1) * 100$$

$$AP\ \% \text{ p.a.} = 0,0469263368$$

$$? \% \text{ p.a. 2 decimal places} = 0,05$$

The calculation method in Treasury Financial Bills secondary market trading, does not differ which was shown in a example related to primary market operations, with the exception of the Updated Nominal Value shown above and the decimal places criterion contained in the table 8 in this document.

4 - NTN-D – National Treasury Notes, Series D

4.1 – Characteristics

Issuer: Brazilian National Treasury Department.

Type of Profitability: US\$ Dollar Linked

Term: Set by the Finance Minister, at the time the security is issued.

Interest: Set by the issuer at the time of issue, in percentage terms per year.

Type: Book-entry system, nominative and negotiable.

Form of Placement: Public offering.

Updating of the Nominal Value: By the variation in the commercial dollar rate, utilizing the selling price of the business day immediately preceding the base-date and the security's redemption date.

Payment of Interest: Every six months, with adjustment in the first fluency period, when suitable. The first interest coupon to be paid will take into consideration the full rate established for six months, regardless of the security's date of issue.

Redemption of the Principal: At the date of maturity.

Base-Date: Reference date for the updating of the nominal value, which may be a date prior to the issue date.

Nominal Value on the Base-Date: R\$ 1,000.00

4.2 – General Trading Considerations in the Secondary Market

- For trading purposes, the rate used is the yield to maturity of the bond, as is the norm with the main securities traded overseas.
- For trading purposes, one only takes into account the term, in business days (under the criterion of 360/30 days in the year/month), of payment of interest and the from date of trading up to date of maturity.
- At a later date, the operation will be registered in SELIC (Special System for Settlement and Custody) in the form of a UP with six decimal places.
- Since trades in the secondary market are made on D-0 and the Exchange rate utilized is that at the close of the previous day, there may be some distortions, bearing in mind that on the day of the trade the market may be very volatile and the spot dollar price may be very different from the quoted price the day before. In this case, these oscillations should be taken into account in the rate negotiated.
- In an attempt to reduce the risk and work with a scenario as close as possible to the present one, financial institutions base their expectations on the day's FX coupon (clean), but are forced to close the deal using the previous day's PTAX rate (dirty).

4.3 – Calculation Formula

- Calculation of the Updated Nominal Value:

$$UNV = 1.000 \times \left(\frac{NI_{k+1}}{NI_k} \right)$$

UNV = Updated Nominal Value.
NI_{k+1} = US dollar selling price (PTAX800) of the immediately preceding business day.
NI_k = US dollar selling price (PTAX800) of the business day immediately preceding the base-date.

- Calculation of the Interest:

$$\text{Interest} = \left(\frac{i}{2} \right)$$

Interest = Rate of interest of the coupon in the six months.
i = Rate of interest (% p.a.) set out in the auction notice.

- Calculation of the Yield to Maturity:

$$\text{YTM} = \left\{ \left[\left(\frac{\text{IRR}}{100} + 1 \right)^{\frac{1}{2}} - 1 \right] \times 2 \right\} \times 100$$

YTM = Yield to maturity or nominal annual rate.
IRR = Internal Rate of Return, corresponds to the effective annual rate.

- Calculation of the Tax Interns of Return:

$$\text{IRR} = \left\{ \left[\left(\frac{\text{YTM}}{200} + 1 \right)^2 - 1 \right] \right\} \times 100$$

YTM = Yield to maturity or nominal annual rate.
IRR = Internal Rate of Return, corresponds to the effective annual rate.

Calculation of the Price based on the effective annual Rate: the price of the operation is the sum of the interest payments and the principal, discounted (brought to present value) using the IRR.

$$\text{Price} = \sum_{i=1}^n \left[\frac{\left(\frac{i}{200} \right)}{\left[\left(\frac{\text{IRR}}{100} + 1 \right)^{\frac{bd_i}{360}} \right]} \right] + \left[\frac{1}{\left[\left(\frac{\text{IRR}}{100} + 1 \right)^{\frac{bd_n}{360}} \right]} \right]$$

Price = Price of the security, vis-à-vis the VNA (Updated Nominal Value).
i = Rate of interest (% p.a.) set out in the auction notice.
n = Number of payment flows of the security.
IRR = Internal Rate of Return, corresponds to the effective annual rate.
du_i = Total days (under the criterion of 360/30 days in the year/month) from the settlement date (including) to the interest *i* payment date (excluding).
du_n = Total days (under the criterion of 360/30 days in the year/month) from the settlement date (including) to the maturity date (excluding).

- Calculation of the UP based on the Price:

$$UP = \text{Price} \times UNV$$

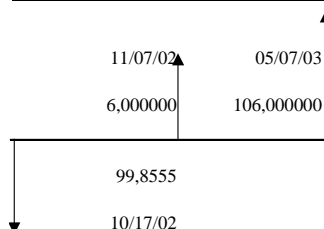
UP = Unit Price.
Price = Price of the security, in relation to the VNA.
UNV = Updated Nominal Value.

Primary Auction of NTN-D (National Treasury Notes, Series D)

Base Methodology 360 days with disclosure of the Nominal Rate (YTM)

Based on the Single Price disclosed by the Central Bank.

Face Value	Average Price	Issue Date	Settlement	Redemption	Base-Date	Term (days)	Interest % p.a.
1.000	99,8555	10/04/01	10/17/02	05/07/03	07/01/00	580	12,00



1 - Calculation of annual interest to % per six months in the Price:

$$X = \frac{i}{2}$$

$$X = \frac{6,000,000}{6,000,000}$$

$$\text{Interest (i) = } 6,000,000$$

$$\text{Interest Factor (IF) = } (006/100)+1$$

$$\text{Interest Factor (IF) = } 1,060000$$

Redemption Price including Interest, but excluding the FX variation:

$$\text{Redemption Price = } 100 * FJ$$

$$\text{Redemption Price = } 106,00000$$

Utilizing Excel to arrive at the Auction's Rate:

	Dates	Days	360 Days	Price/Coupon	Payts.Discounted
Average Price	10/17/02	--	--	-99,8555	99,8555
Value 1st Int. Instal.	11/07/02	21	20	6,000000	5,927888
Price + six-monthly interest	05/07/03	202	200	106,000000	93,927632

Sum	12,1445
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IRR Function - Excel	12,527
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From the moment that it is determined that the IRR is equal to 12.527 this rate should be utilized to determine the bond's discounted cash flow. Utilizing this IRR (12.527), the initial price obtained was one of 105.2333. This occurred because, for calculation purposes, Excel's IRR function always assumes six-monthly payments of 180 days. Since in this case the first payment occurs after 20 days, it is necessary to utilize the tool Reach Targets. This tool will find the rate at which, after discounting interest rate payments, the NPV obtained will be zero.

IRR - Goal Seek	24,315
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Utilizing Excel's Goal Seek tool, one arrives at an IRR of 24.315. With this rate it is possible to produce the discounted cash flow and arrive at the bond's average price (99.8555). The next step is to utilize the Yield to Maturity formula: $((1 + \text{TIR})^{1/2} - 1) \times 2$, in order to arrive at the rate disclosed by the Central Bank. This should be the rate utilized for the trade on the secondary market.

YTM - Nominal Rate Disclosed by the Central Bank	22,99
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Calculation of the Registration UP: (Nominal Issue Value/Base-Date x Factor of the bill's FX rate variation during the period) x Price %:

$$\text{Nominal Issue Value/Base-date = } 1.000$$

Factor of the bill's FX rate variation during the period = Exchange Rate from the day before the settlement date / Exchange Rate from the day before the base-date.

$$\text{PTAX selling price from the 16/10/02 = } 3,8744$$

$$\text{PTAX selling price from the 30/06/00 = } 1,8000$$

$$\text{FX rate variation factor = } 2,1524$$

$$\text{Update Nominal Value at the Settlement Date = } 2.152,444444$$

$$\text{Registration UP = } (1,000 \times 2,1524) \times 99,8555\%$$

$$\text{Registration UP = } 2.149,334162$$

The calculation method in National Treasury Notes, Series D (NTN-D) secondary market trading, does not differ which was shown in an example related to primary market operations, with the exception of the Updated Nominal Value shown above and the decimal places criterion contained in the table 8 in this document.

5 - NTN-C –National Treasury Notes, Series C

5.1 – Characteristics

Issuer: Brazilian National Treasury.

Type of Profitability: Inflation-linked (IGP-M).

Term: Set by the Finance Minister, at the time the security is issued.

Interest: Set by the issuer at the time of issue, in percentage terms per year.

Type: Book-entry system, nominative and negotiable.

Form of Placement: Public offering.

Updating of the Nominal Value: IGP-M, General Index of Market Prices, as determined by the Getúlio Vargas Foundation (FGV).

Payment of Interest: Every six months, with adjustment in the first fluency period, when suitable. The first interest coupon to be paid will take into consideration the full rate established for six months, regardless of the security's date of issue.

Redemption of the Principal: At the date of maturity.

Base-Date: Reference date for the updating of the nominal value, which may be a date prior to the issue date.

Nominal Value on the Base-Date: R\$ 1,000.00

5.2 – General Trading Considerations in the Secondary Market

- For trading purposes, the rate used is the effective annual rate, based on 252 business days, with up to four decimal places.
- For trading purposes, one only takes into account the term, in business days, of payment of interest and the from date of trading up to date of maturity.
- At a later date, the operation will be registered in SELIC (Special System for Settlement and Custody) in the form of a UP with six decimal places.
- For the purpose of calculating the VNA, since the monthly IGP-M (General Index of Market Prices) variation is published at the end of every month, an agreement was made to utilize the forecast IGP-M result based on the consensus of ANDIMA's (National Association of Financial Market Institutions) Macroeconomic Monitoring Committee. The projections are updated each time either a preview or the final index is published.
- ANDIMA's Operating and Ethics Committee considers that in the case of trades on the secondary market of Federal Government securities, involving Inflation-linked bonds, when not fixed to the (UP) Unit Price, the criterion utilized for the apportionment of the index will be that which takes into account the accounting in business days, in accordance with ANDIMA's practice bulletin no. 4/01.

5.3 - Calculation Formula

- **Calculation of the Updated Nominal Value - Issues/base-date on the 1st of the month (without any need to apportion the IGP-M on a pro-rata basis):**

$$UNV = 1.000 \times \left(\frac{NI_{k+1}}{NI_k} \right)$$

UNV = Updated Nominal Variation.
 NI_{k+1} = IGP-M index's number value for the previous month.
 NI_k = IGP-M index's number value for the month preceding the base-date/issue.

n.b.: The expression $\left(\frac{NI_{k+1}}{NI_k} \right)$ is used without rounding, in other words, with all the decimal places.

n.b.: For auctions with a settlement date other than the 1st of the month, the National Treasury will publish the adjusted VNA in the auction ordinance.

- **Calculation of the Updated Nominal Value - Issues/base-dates other than the 1st of the month (without any need to apportion the IGP-M on a pro-rate basis):**

$$UNV = 1.000 \times \left(\frac{NI_{k+1}}{NI_k} \right) \times AEF$$

UNV = Updated Nominal Variation.
 NI_{k+1} = IGP-M index's number value for the previous month.
 NI_k = IGP-M index's number value for the month preceding the base-date/issue.
 AEF = Adjusted Earnings Factor, corresponds to the pro-rata apportionment.

- **Calculation of the pro-rata apportionment of the IGP-M:**

$$AEF = \left(\frac{NI_{k+1}}{NI_k} \right) \left(\frac{dp}{dt} \right)$$

AEF = Adjusted Earnings Factor, corresponds to the pro-rata apportionment.
 NI_{k+1} = IGP-M index's number value for the month of issue.
 NI_k = IGP-M index's number value for the month prior to the issue date.
 dp = Total days from the issue date (including) to the 1st day of the month following the issue date (excluding).
 dt = Total days of the month corresponding to the issue date.

- **Calculation of the pro-rata apportionment of the IGP-M for the purpose of trading on the secondary market:**

$$ProRata = (IGPM) \left(\frac{dp}{dt} \right)$$

Pro-Rata Apportionment =

ProRata = Pro-rata apportionment of the forecast IGP-M figure or of the final index disclosed by the FGV.
 IGPM = Forecast IGP-M figure from ANDIMA's Macroeconomic Committee or the final index disclosed by the FGV.
 dp = Business days from the 1st day of the reference month (including) to the settlement date (excluding).
 dt = Business days from the 1st day of the reference month (including) to the 1st day of the following month (excluding).

n.b.: If the reference index is already known (published by the FGV), the official variation is used, if not, one uses the forecast that is published by ANDIMA's Macroeconomic Monitoring Committee for the reference month, with two decimal places.

n.b.: The pro-rate apportionment is used without rounding, in other words, with all the decimal places.

Calculation of the Updated Nominal Value for the purpose of trading on the secondary market:

$$UNV = 1.000 \times \left(\frac{NI_{k+1}}{NI_k} \right) \times ProRata$$

UNV = Updated Nominal Variation.
NI_{k+1} = IGP-M index's number value for the previous month.
NI_k = IGP-M index's number value for the month preceding the base-date.
ProRata = Pro-rata apportionment of the forecast IGP-M figure.

n.b.: The expression $\left(\frac{NI_{k+1}}{NI_k} \right)$ and the pro-rata apportionment are used without rounding, with all the decimal places.

- Calculation of the Interest:

$$Interest = \left\{ \left[\left(\frac{i}{100} + 1 \right)^{\frac{6}{12}} \right] - 1 \right\} \times 100$$

Interest = Rate of interest of the coupon in the six months.
i = Rate of interest (% p.a.) set out in the auction notice.

Calculation of the Price based on the effective annual Rate: the price of the operation is the sum of the interest payments and the principal, discounted (brought to present value) using the IRR.

$$Price = \sum_{i=1}^n \frac{\left[\left(\frac{i}{100} + 1 \right)^{\frac{6}{12}} \right] - 1}{\left[\left(\frac{IRR}{100} + 1 \right)^{\frac{bd_i}{252}} \right]} + \frac{1}{\left[\left(\frac{IRR}{100} + 1 \right)^{\frac{bd_n}{252}} \right]}$$

Price = Price of the security, vis-à-vis the VNA (Updated Nominal Value).
i = Rate of interest (% p.a.) set out in the auction notice.
n = Number of payment flows of the security.
IRR = Internal Rate of Return, corresponds to the effective annual rate.
bd_i = Business days from the settlement date (including) to the interest *i* payment date (excluding).
bd_n = Business days from the settlement date (including) to the maturity date (excluding).

- Calculation of the UP based on the Price:

$$UP = Price \times UNV$$

UP = Unit Price.
Price = Price of the security, in relation to the VNA.
UNV = Updated Nominal Value.

Primary Auction of NTN-C (National Treasury Notes, Series C)

Based on the Single Price disclosed by the Central Bank.

Face Value	Average Price	Issue Date	Settlement	Redemption	Base-Date	Term (days)	Term (bus.days)	Interest % p.a.
1.000	92,1320	06/01/05	06/01/05	04/01/08	07/01/00	1,035	709	6,00

10/03/05	04/03/06	10/02/06	04/02/07	10/01/07	04/01/08
2,956301	2,956301	2,956301	2,956301	2,956301	102,956301

92,1320
06/01/05

1 - Calculation of Annual Interest to % per six months:

$$X = (((006/100)+1)^{(6/12)}-1)*100$$

$$X = 2,956301$$

$$\text{Interest (i)} = 2,956301$$

$$\text{Interest Factor (IF)} = (i/100)+1$$

$$\text{Interest Factor (IF)} = 1,02956301$$

Redemption Price Including the Interest

$$\text{Redemption Price} = 100*FJ$$

$$\text{Redemption Price} = 102,956301$$

Utilizing Excel to arrive at the Auction's Rate:

	Dates	Days	252 Days	Price/Coupon	Payts. Discounted
Average Price	06/01/05	--	--	-92,1320	92,1320
Value 1st Int. Instal.	10/03/05	124	87	2,956301	2,862046
Value 2nd Int. Instal.	04/03/06	306	212	2,956301	2,731858
Value 3rd Int. Instal.	10/02/06	488	337	2,956301	2,607591
Value 4th Int. Instal.	04/02/07	670	460	2,956301	2,490832
Value 5th Int. Instal.	10/01/07	852	586	2,956301	2,376645
Price + Six-Monthly Interest.	04/01/08	1.035	709	102,956301	79,063042

Sum	25,605806
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IRR Function - Excel	9,16
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From the moment that it is determined that the IRR is equal to 9.160 this rate should be utilized to determine the bond's discounted cash flow. Utilizing this IRR (9.160), the initial price obtained was one of (93.6254). This occurred, because for calculation purposes, Excel's IRR function always assumes six monthly payments of 180 days. Since this bond is priced in Reais, the discounted cash flow needs to take into account the number of business days between the coupon payments. It will be necessary to set up a discounted cashflow based on the number of business days and then utilize the tool Reach Targets. This tool will find the rate at which, after discounting the interest payments, the NPV obtained will be zero.

IRR - Goal Seek	9,84
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Utilizing Excel's Goal Seek tool, one arrives at an IRR of 9.84. With this rate it is possible to produce the discounted cash flow and arrive at the bond's average price, which was one of 92.1320. This will be the value given by the Authority. The IRR based on 252 business days should be the rate used for the trade on the secondary market.

Calculation of the Registration UP: (Nominal Issue Value/Base Date x Factor of the IGP-M variation during the period) x Price in % :

Nominal Issue Value/base-date = 1.000

Factor of the bond's IGP-M variation during the period = IGP-M Index Number (May/05)/IGP-M Index Number (June/00)

IGP-M Index Number (June/00) 183,745

IGP-M Index Number (May/05) 338,299

IGP-M variation factor = 1,8411

Nominal Value Updated at the Settlement Date = 1.841,133092

Registration UP = (1,0000 x 1,8411) x 92,1320%

Registration UP = 1.696,272740

Example of a UP Calculation in a trade on the secondary market involving a NTN-C (Inflation Linked Treasury Bond)

Ref.: ANDIMA'S OPERATING AND ETHICS COMMITTEE - GUIDANCE N° 4/01

ANDIMA's Operating and Ethics Committee considers that in the case of trades on the secondary market of Federal Government securities, involving Inflation linked Bonds, when not fixed to the (UP) Unit Price, the criterion utilized for the apportionment of the index will be that which takes into account the accounting in business days.

The Trade's Settlement Date: 06/13/05

Last day of the month of settlement: 06/30/05

Forecast of the IGP-M % p.m.: -0,05

Total Number of Business Days in the ! 21

Number of Business Days in the Month up to the Settlement 8

Pro Rata IGP-M Factor = 0,999809494

Nominal Value Updated at the Settlement Date = 1.840,78234569

The calculation method in National Treasury Notes, Series C (NTN-C) secondary market trading, does not differ which was shown in a example related to primary market operations, with the exception of the Updated Nominal Value shown above and the decimal places criterion contained in the table 8 in this document.

6 - NTN-B – National Treasury Notes, Series B

6.1 – Characteristics

Issuer: Brazilian National Treasury.

Type of Profitability: Inflation-linked (IPCA).

Term: Set by the Finance Minister, at the time the security is issued.

Interest: Set by the issuer at the time of issue, in percentage terms per year.

Type: Book-entry system, nominative and negotiable.

Form of Placement: Public offering.

Updating of the Nominal Value: IPCA (Amplified Consumer Price Index), as determined by the Brazilian Institute of Geography and Statistics (IBGE).

Payment of Interest: Every six months, with adjustment in the first fluency period, when suitable. The first interest coupon to be paid will take into consideration the full rate established for six months, regardless of the security's date of issue.

Redemption of the Principal: At the date of maturity.

Base-Date: Reference date for the updating of the nominal value, which may be a date prior to the issue date.

Nominal Value on the Base-Date: R\$ 1,000.00

6.2 – General Trading Considerations in the Secondary Market

- For trading purposes, the rate used is the effective annual rate, based on 252 business days, with up to four decimal places.
- For trading purposes, one only takes into account the term, in business days, of payment of interest and the from date of trading up to date of maturity.
- At a later date, the operation will be registered in SELIC (Special System for Settlement and Custody) in the form of a UP with six decimal places.
- For the purpose of calculating the VNA, since the monthly IPCA (Amplified Consumer Price Index) variation is published at the end of every month, an agreement was made to utilize the forecast IPCA result based on the consensus of ANDIMA's (National Association of Financial Market Institutions) Macroeconomic Monitoring Committee. The projections are updated each time either the IPCA-15 or the final IPCA index are published.
- ANDIMA's Operating and Ethics Committee considers that in the case of trades on the secondary market of Federal Government securities, involving Inflation-linked bonds, when not fixed to the (UP) Unit Price, the criterion utilized for the pro-rate apportionment of the index will be that which takes into account the accounting in business days, in accordance with ANDIMA's practice bulletin no. 4/01.

6.3 – Calculation Formula

- **Calculation of the Updated Nominal Value – Base-date on the 15th of the month (without any need to apportion the IPCA on a pro-rate basis):**

$$UNV = 1.000 \times \left(\frac{NI_{k+1}}{NI_k} \right)$$

UNV = Updated Nominal Variation.
NI_{k+1} = IPCA index's number value for the previous month.
NI_k = IPCA index's number value for the month preceding the base-date.

n.b.: The expression $\left(\frac{NI_{k+1}}{NI_k} \right)$ is used without rounding, in other words, with all the decimal places.

n.b.: For auctions with a settlement date other than the 15th of the month, the National Treasury will publish the adjusted VNA in the auction ordinance.

- **Calculation of the pro-rate apportionment of the IPCA for purposes of trading in the secondary market:**

$$ProRata = (IPCA) \left(\frac{bd}{dt} \right)$$

ProRata = Pro-rata apportionment of the forecast IPCA figure or of the final index if this has already been published by the IBGE.
IPCA = Forecast IPCA figure from ANDIMA's Macroeconomic Committee or the final index this has already been published by the IBGE.
- Up to the 15th of the reference month:
dp = Business days from the 15th of the previous month (including) to the settlement date (excluding).
dt = Business days from the 15th of the previous month (including) to the 15th of the reference month (excluding).
- After the 15th of the reference month:
dp = Business days from the 15th of the reference month (including) to the settlement date (excluding).

n.b.: If the reference index is already known (published by the IBGE), the official variation is used, if not, will be used the forecast that is published by ANDIMA's Macroeconomic Monitoring Committee for the reference month, with two decimal places.

n.b.: The pro-rata apportionment is used without rounding, in other words, with all the decimal places.

- **Calculation of the Updated Nominal Value for purposes of trading in the secondary market:**

$$UNV = 1.000 \times \left(\frac{NI_{k+1}}{NI_k} \right) \times ProRata$$

UNV = Updated Nominal Variation.
NI_{k+1} = IPCA index's number value for the previous month.
NI_k = IPCA index's number value for the month preceding the base-date.
ProRata = Pro-rata apportionment of the forecast IPCA figure.

n.b.: The expression $\left(\frac{NI_{k+1}}{NI_k} \right)$ and the pro-rata apportionment are used without rounding, with all the decimal places.

- **Calculation of Interest:**

$$Interest = \left\{ \left[\left(\frac{i}{100} + 1 \right)^{\frac{6}{12}} \right] - 1 \right\} \times 100$$

Interest = Rate of interest of the coupon in the six months.
i = Rate of interest (% p.a.) set out in the auction notice.

Calculation of the Price based on the effective annual Rate: the price of the operation is the sum of the interest payments and the principal, discounted (brought to present value) using the IRR.

$$Price = \sum_{i=1}^n \frac{\left[\left(\frac{i}{100} + 1 \right)^{\frac{6}{12}} \right] - 1}{\left[\left(\frac{TIR}{100} + 1 \right) \right]^{\frac{du_i}{252}}} + \frac{1}{\left[\left(\frac{TIR}{100} + 1 \right) \right]^{\frac{du_n}{252}}}$$

Price = Price of the security, vis-à-vis the VNA (Updated Nominal Value).
i = Rate of interest (% p.a.) set out in the auction notice.
n = Number of payment flows of the security.
IRR = Internal Rate of Return, corresponds to the effective annual rate.
bd_i = Business days from the settlement date (including) to the interest *i* payment date (excluding).
bd_n = Business days from the settlement date (including) to the maturity date (excluding).

- **Calculation of the UP based on the Price:**

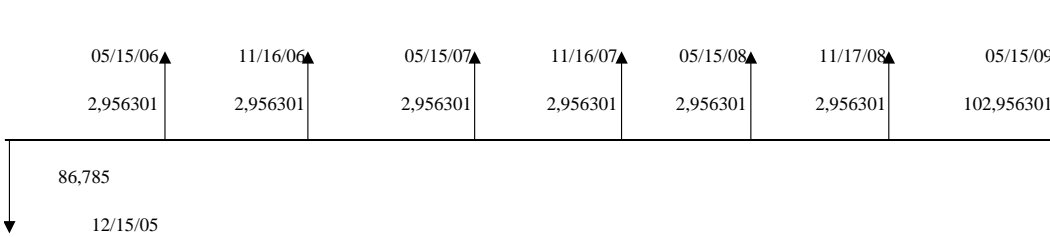
$$UP = Price \times UNV$$

UP = Unit Price.
Price = Price of the security, in relation to the VNA.
UNV = Updated Nominal Value.

Primary Auction of NTN-B (National Treasury Notes, Series B)

Based on the Single Price disclosed by the Central Bank.

Face Value	Average Price	Issue Date	Settlement	Redemption	Base-Date	Term (days)	Term (bus.days)	Interest % p.a.
1.000	86,7850	07/15/00	12/15/05	05/15/09	07/15/00	1.247	855	6,00



1 - Calculation of Annual Interest to % per six months:

$$X = (((006/100)+1)^{(6/12)}-1)*100$$

$$X = 2,956301$$

$$\text{Interest (i)} = 2,956301$$

$$\text{Interest Factor (IF)} = (i/100)+1$$

$$\text{Interest Factor (IF)} = 1,02956301$$

Redemption Price Including the Interest

$$\text{Redemption Price} = 100*FJ$$

$$\text{Redemption Price} = 102,956301$$

Utilizing Excel to arrive at the Auction's Rate:

	Dates	Days	252 Days	Price/Coupon	Payts. Discounted
Average Price	12/15/05	--	--	-86,7850	86,7850
Value 1st Int. Instal.	05/15/06	151	102	2,956301	2,832064
Value 2nd Int. Instal.	11/16/06	336	230	2,956301	2,683518
Value 3rd Int. Instal.	05/15/07	516	352	2,956301	2,549194
Value 4th Int. Instal.	11/16/07	701	480	2,956301	2,415485
Value 5th Int. Instal.	05/15/08	882	602	2,956301	2,294578
Value 6th Int. Instal.	11/17/08	1.068	733	2,956301	2,171480
Price + Six-Monthly Interest.	05/15/09	1.247	855	102,956301	71,838704

Sum	33,9091
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IRR Function - Excel	10,80
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From the moment that it is determined that the IRR is equal to 10.80, this rate should be utilized to determine the bond's discounted cash flow. Utilizing this IRR (10.80), the initial price obtained was one of 87.7283. This occurred, because for calculation purposes, Excel's IRR function always assumes six-monthly payments of 180 days. Since this bond is priced in Reais, the discounted cash flow needs to take into account the number of business days between the coupon payments. It will be necessary to set up a discounted cashflow based on the number of business days and then utilize the tool Reach Targets. This tool will find the rate at which, after discounting the interest payments, the NPV obtained will be zero.

IRR - Goal Seek	11,19
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Utilizing Excel's Goal Seek tool, one arrives at an IRR of 11.19. With this rate it is possible to produce the discounted cash flow and arrive at the bond's average price, which was one of 86.7850. This will be the value given by the Authority. The IRR based on 252 business days should be the rate used for the trade on the secondary market.

Calculation of the Registration UP: (Nominal Issue Value/Base Date x Factor of the IPCA variation during the period) x Price in % :

Nominal Issue Value/base-date = 1.000

Factor of the bond's IPCA variation during the period = IPCA Index Number (Nov/05)/IPCA Index Number (June/00)

IPCA Index Number (June/00) 1.614,62

IPCA Index Number (Nov/05) 2.526,31

IPCA variation factor = 1,564647

Nominal Value Updated at the Settlement Date = 1.564,646789

Registration UP = (1,0000 x 1.564647) x 86.7850%

Registration UP = 1.357,878716

Example of a UP Calculation in a trade on the secondary market involving a NTN-B (Inflation Linked Treasury Bond)

Ref.: ANDIMA'S OPERATING AND ETHICS COMMITTEE - GUIDANCE N° 4/01

ANDIMA's Operating and Ethics Committee considers that in the case of trades on the secondary market of Federal Government securities, involving Inflation linked bonds, when not fixed to the (UP) Unit Price, the criterion utilized for the apportionment of the index will be that which takes into account the accounting in business days.

For trades after the 15th of the month:

The Trade's Settlement Date: 12/20/05

16th day of the month following settlement: 01/16/06

15th day of the month of settlement: 12/15/05

Forecast of the IPCA % p.m.: 0,35

Business Days between the 15th of the month to the following 22

Business Days from the 15th to the Settlement Date = 3

Pro Rata IPCA Factor = 1,000476553

Nominal Value Updated at the Settlement Date = 1.565,39242606

The calculation method in National Treasury Notes, Series B (NTN-B) secondary market trading, does not differ which was shown in an example related to primary market operations, with the exception of the Updated Nominal Value shown above and the decimal places criterion contained in the table 8 in this document.

Decimal places criterion in Primary Auction

Bonds	UNV		UP		Price (% of UNV)		Internal Rate of Return	
	Criteria*	Decimal Point	Criteria*	Decimal Point	Criteria*	Decimal Point	Criteria*	Decimal Point
LTN	--	--	F	6	Ñ	4	F	3
NTN-F	--	--	F	6	Ñ	4	F	3
LFT	F	8	F	6	Ñ	4	R	2
NTN-D	F	6	F	6	Ñ	4	R	6
NTN-C	F	6	F	6	Ñ	4	R	2
NTN-B	F	6	F	6	Ñ	4	R	2

Bonds	YTM		Interest (% of UNV)		Financial	
	Criteria*	Decimal Point	Criteria*	Decimal Point	Criteria*	Decimal Point
LTN	--	--	--	--	F	2
NTN-F	--	--	R	6	F	2
LFT	--	--	--	--	F	2
NTN-D	R	2	R	6	F	2
NTN-C	--	--	R	6	F	2
NTN-B	--	--	R	6	F	2

***Subtitle:**

R = Rounded.

F = Fixed.

Ñ = Not Applied.

Decimal places criterion in Secondary Market

Bonds	UNV		UP		Price (% of UNV)		Internal Rate of Return	
	Criteria*	Decimal Point	Criteria*	Decimal Point		Criteria*	Decimal Point	Criteria*
LTN	--	--	R	8	R	4	F	4
NTN-F	--	--	R	8	R	4	F	4
LFT	F	8	R	8	R	4	F	4
NTN-D	F	6	R	8	R	4	F	4
NTN-C	F	6	R	8	R	4	F	4
NTN-B	F	6	R	8	R	4	F	4

Bonds	YTM		Interest (% of UNV)		Financial	
	Criteria*	Decimal Point	Criteria*		Criteria*	Decimal Point
LTN	--	--	--	--	F	2
NTN-F	--	--	R	6	F	2
LFT	--	--	--	--	F	2
NTN-D	F	4	R	6	F	2
NTN-C	--	--	R	6	F	2
NTN-B	--	--	R	6	F	2

*** Subtitle:**

R = Rounded.

F = Fixed.

Ñ = Not Applied.