

## **BTP Italia**

### *Explanatory Note*

## **The BTP indexed to Italian inflation, designed for retail investors**

### **1. What is the BTP indexed to Italian inflation?**

The new security is a government security that provide investors with the protection against an increase in the level of prices in Italy: both the coupons, which are paid semi-annually, and the principal, the revaluation of which is also paid semi-annually, are indexed to the Italian inflation, as measured by ISTAT – the Italian National Bureau of Statistics - through the FOI national index, “Prezzi al consumo per le famiglie di operai e impiegati”, with the exclusion of tobacco products. As a result of the indexation mechanism employed, the principal subscribed is revalued every six months, with the holder of the security thus recovering any loss of purchasing power during this period. Furthermore, the coupons, which are also paid on a semi-annual basis, yield a constant minimum return in real terms. Indeed, the amount of each coupon is calculated by multiplying half the annual real rate of interest (fixed upon issuance) by the subscribed principal, which is revalued semi-annually in relation to the actual inflation of the semester. At maturity, the BTP Italia guarantees the reimbursement of the nominal face value subscribed.

### **2. The indexation mechanism used for the calculation of the semi-annual coupons and the principal revaluation**

#### **2.1. The Indexation Coefficient**

The nominal value of principal subscribed and the coupons are revalued through an Indexation Coefficient (IC). The IC is calculated based on inflation as reported by the FOI index, with the exclusion of tobacco products, which is computed and published monthly by ISTAT (the National Bureau of Statistics). With this coefficient, it is possible to determine at a given day (day "d" of month "m"), the value of the nominal principal revalued on the basis of the trend of prices.

The IC is calculated through the following formula:

$$IC_{d,m} = \frac{\text{index number}_{d,m}}{\text{index number}_{\bar{d},m}}$$

where the  $\text{index number}_{d,m}$  indicates the price index number at day "d" of month "m" corresponding to the

coupon payment date, whereas index number  $_{d,m}$ , the base price index, indicates the price index number as of the previous coupon payment date (6 months earlier). The value of the Indexation Coefficient obtained in this manner is computed with six decimals and then rounded to the fifth decimal. For the payment of the **first coupon**, as the first accrual date is equal to the settlement date of the bond, the base price index number for the IC is that as of the settlement date of the bond.

## 2.2. Calculation of the reference price index number

Since the FOI index, excluding tobacco products, is published by ISTAT during the second half of the month subsequent to the month of reference, the following formula of calculation by interpolation is used for computing the price index number at any given date (day "d" of the month "m"):

$$\text{Index number }_{d,m} = \text{FoiIN}_{m-3} + \frac{d-1}{\text{days}} * (\text{FoiIN}_{m-2} - \text{FoiIN}_{m-3})$$

where:

Index number  $_{d,m}$  indicates the index number of day "d" of month "m";

$\text{FoiIN}_{m-3}$  is the FOI index, excluding tobacco products, for the month that is three months prior to the month for which the calculation is to be made;

$\text{FoiIN}_{m-2}$  is the FOI index, excluding tobacco products, for the month that is two months prior to the month for which the calculation is to be made;

"d" is the day of the month for which the calculation is being made;

"days" is the actual number of days in month "m".

The index number at the coupon payment date is therefore calculated starting from the ISTAT FOI indices, excluding tobacco products, in relation to three months and two months prior to the month for which the calculation is done. The value thus obtained is computed with six decimals and then rounded to the fifth decimal. The monthly ISTAT index values needed for the calculation of the index numbers and thus needed for the calculation of the Indexation Coefficient, can be found on the ISTAT website at the following link: <http://rivaluta.istat.it/Rivaluta/#>.

In addition, the daily values of the Indexation Coefficients are published monthly on the Treasury Public Debt website: <http://www.publicdebt.it/>, in the BTP Italia section.

## 2.3. Revisions of the FOI index by ISTAT

If the values of the price index number are revised after their initial publication, calculations will continue to use the values published before revision.

#### 2.4. Non-publication of the FOI index by ISTAT

If the ISTAT FOI index is not published within a suitable period in relation to a month  $m$ , a substitute index number (SIN) will be used, calculated according to the following formula:

$$SIN_m = FoIN_{m-1} * \left( \frac{FoIN_{m-1}}{FoIN_{m-13}} \right)^{1/12}$$

The substitute index number is applied for the computation of interest payments and principal revaluation done prior to the publication of the definitive index. Any payments based on the substitute index will not be adjusted.

#### 2.5. The calculation of the semi-annual coupons and principal revaluation

The BTP Italia yields a constant rate of interest in real terms, that is to say in terms of purchasing power; such rate is set upon issuance (the so-called annual real coupon rate). The variable semi-annual coupons are calculated by multiplying half the real annual coupon rate, by the nominal principal revalued at the coupon payment date (that corresponds to the nominal value of principal subscribed multiplied by the adjusted Indexation Coefficient at the coupon payment date).

$$Coupon_t = \frac{\text{Annual Real Coupon Rate}}{2} * \text{Nominal Value of Principal Subscribed} * \text{Max} [IC_t, 1]$$

where  $IC_t$  represents the Indexation Coefficient described in section 2.1, whereas  $\text{Max} [IC_t, 1]$  represents the adjusted Indexation Coefficient.

Indeed, if the Indexation Coefficient of the semester is less than 1 (in the event of a reduction in prices on a semi-annual basis), thus implying in theory a devaluation of principal, it is assumed that the price index number is equal to that of the preceding period (the so-called coupon floor mechanism). As a result, the Indexation Coefficient is made equal to 1 (adjusted Indexation Coefficient), and therefore, the interest paid becomes equal to the real coupon rate, which represents the guaranteed minimum return. **In the following period, if the Indexation Coefficient on a semi-annual basis goes back above 1, the price index number for the previous semester is used as a base, provided that such price index number is higher than the last highest reported price index of the previous semesters; otherwise, the base will be represented by this price index number.**

Beyond the payment of semi-annual coupons, the security pays the revaluation of the nominal value of principal subscribed, accrued during the semester of reference:

$$\text{Principal Revaluation}_t = \text{Nominal Value of Principal Subscribed} * \text{Max} (IC_t - 1, 0)$$

If the Indexation Coefficient for the semester is less than 1, no revaluation is paid (the so-called principal floor mechanism). **In the following semester, if the Indexation Coefficient on a semi-annual basis goes back above 1, the price index number for the previous semester is used as a base, provided that such index number is higher than the highest reported in the previous semesters; otherwise, the base will be represented by this price index number.**

For the payment, the result obtained by each of the previous operations (calculation of the coupon and calculation of principal revaluation), includes a number of decimals not less than ten. Then, it is rounded to two decimal. The total return for any six-month period is thus given by the sum of the coupon and the principal revaluation for the period of reference:

$$\text{Semi - Annual Return}_t = \text{Coupon}_t + \text{Principal Revaluation}_t$$

### 3. The calculation of accrued amounts

The price quotation of the BTP Italia on the secondary market is in "real" terms: the quoted price, and thus, the price for a potential trade, does not take into account the indexation component. The countervalue at which the trade is settled is obtained by multiplying the quoted/trading price by the Indexation Coefficient as of the settlement date of the transaction, and then adding the accrued interest also revalued by the Indexation Coefficient (without adjustments for taking into account potential deflation during the semi-annual period). The sum of the indexed countervalue and the indexed interest accrued will be equal the sum of the clean real price, and both the accrued principal revaluation (valued on real price quoted on the market) and the accrued (coupon) interest revalued, which are illustrated below. In the calculation of accrued amounts for trading on the secondary market, the market convention of *actual/actual* is used.

#### 3.1. Accrued coupon interest

The calculation of accrued coupon interest ( $RC_{d,m}$ )<sup>1</sup> of the BTP Italia occurs in two steps.

1. The percentage of the coupon that has accrued to the settlement date of the transaction (AC%) is calculated:

$$AC\% = \frac{\text{Annual Real Coupon Rate}}{2} * \frac{\text{relevant days}}{\text{days between payment of due coupons}}$$

where the "relevant days" is the number of days between the payment date of the previous coupon and the settlement date of the transaction (day "d" of month "m") .

2. The value obtained above is then multiplied by the nominal value of principal subscribed revalued at

<sup>1</sup> The calculation of the accrued interest on the secondary market has an approximation of five decimal points per €100 of principal.

the settlement date (equal to nominal value of principal subscribed multiplied by the Indexation Coefficient):

$$RC_{d,m} = AC\% * \text{Nominal Value of Principal Subscribed} * IC_{d,m}$$

### 3.2. Accrued principal revaluation

The accrual of the principal revaluation ( $RRC_{d,m}$ ) is calculated as follows:

$$RRC_{d,m} = \text{Nominal Value of Principal Subscribed} * \frac{Pr}{100} * (IC_{d,m} - 1)$$

where Pr indicates the "real" price quotation on the market at the date of trade (day "d" of month "m").