



government papers



1. treasury bill

MIFID classification

defensive

Discount treasury bills are potential alternatives to regular term deposits. It has favourable liquidity properties meaning you can mobilize your investment anytime under normal market conditions. Discount treasury bills are government securities with maturity less than one year. No interest is paid on these securities; instead, they are issued at a discount, i.e. at a price lower than the face value of the security, and the face value is repaid on redemption date. The difference between the face value and the purchase price is the discount, i.e. the yield of the security.

product description

Discount treasury bills are issued by the Hungarian Debt Management Agency representing the debt of the Hungarian State for maturities less than one year. Treasury bill payments are guaranteed by the state. These securities are issued on weekly, bi-weekly auctions through the primary dealers (e.g. K&H Bank Zrt.).

Discount treasury bills pay no interest, however the investor realises a yield as the securities can be bought before maturity at a price lower than the face value, at a so called discount value and upon maturity the face value (HUF 10 000) is repaid. In case

of a discount treasury bill the payment upon maturity is fixed similarly to a regular term deposit, thus the yield until maturity is certain.

The price of a treasury bill can be interpreted as the sum needed to be placed in a term deposit at current market levels to receive at maturity a sum equal to the face value of the treasury bill, i.e. HUF 10,000. As most investors are concerned with the yield level, the trading of the securities is based on the yield. This yield level expresses the realised gain in case the security is held until maturity. An important difference from term deposits is that interest on term deposits are calculated with 365 days / year, while treasury bills are calculated with 360 days / year – their comparability will be explained below.

In summary: a treasury bill held until maturity pays fixed interest, which is comparable with the interest level of a term deposit with the same tenor. The liquid secondary market allows the sale of the security before maturity, thus if you need the invested amount you can sell your treasury bills, however the time proportional yield will be uncertain, i.e. it can be lower or higher than the yield level at the time of purchase (in extreme cases it can be negative even). Sale of a treasury bill does not involve additional costs as breaking the deposit in case of a term deposit.

yield and price calculation for treasury bills

calculating price from yield:

$$\text{price} = \frac{\text{notional (HUF 10 000)}}{1 + (\text{yield} / 100) \times (\text{number of days until maturity}) / 360}$$

for example: 6.00% yield and maturity in 90 days: $10,000 / (1 + (6/100) * 90/360) = 9852.21$ forint, i.e. 98.5221% of the face value. The price is typically given as a percentage, which is rounded to the fourth digit according to market convention.

It is important to note that interest on term deposits are calculated with 365 days/year, while yield on treasury bills is calculated using 360 days/year. Due to the different day count for example a 6% yield on a treasury bill is equivalent to 6.083% interest on a term deposit, as $6\% * (365/360) = 6.083\%$ If you wish to sell your investment before maturity the realised yield can be calculated using the formula below:

$$\text{realized annual rate} = \left(\frac{\text{selling price}}{\text{purchase price}} \right) \times \frac{360}{\text{days elapsed}} \times 100$$

for example: a security bought at HUF 9400 and sold 90 days later for HUF 9550: $(9550 / 9400 - 1) * (360 / 90) * 100 = 6.38\%$

example for buying discount treasury bill – held until maturity: an investor wishes to invest his HUF 100 million for 12 months. Actual price of a 12-month treasury bill is 94.3396% (as a percentage of the face value), i.e. HUF 9433.96/piece. Thus 10 600 pieces of treasury bills can be bought with HUF 100 million, which pay upon maturity HUF 106 million. So the annual return is 6.00%

example for buying discount treasury bill – sold before maturity: an investor wishes to invest his HUF 200 million for 1 year. He places HUF 100 million in term deposit with 6.08% interest, while he buys treasury bills for HUF 100 million with 6.00% yield. (This equals to the 6.08% interest due to the base difference). He buys 10 600 pieces of treasury bills, which pay HUF 106 million at maturity. Six months (183 days) after the transactions he wishes to access HUF 100 million.

In this case he can choose from 2 solutions. The first possibility is to break his deposit. In this case however the bank pays only 1% sight interest, i.e. HUF 100 500 000 is repaid after the invested 100 million. The realised annual interest for a half-year is 1%. The other possibility is to sell his treasury bills worth of HUF 100 million before maturity. In this case there are three scenarios depending on the evolution of the market yield.

1. market yield **increases by 1%** - after six months of purchase the price of the treasury bill at 7% market yield is HUF 9662.73 / piece. So 10 660 pieces worth HUF 102 424 948, i.e. the realised annual yield for half a year is **4.77%**
2. market yield **unchanged** - after six months of purchase the price of the treasury bill at 6% market yield is HUF 9709.51 / piece. So 10 660 pieces worth HUF 102 920 834, i.e. the realised annual yield for half a year is **5.75%** (Although the market yield remained unchanged, your realised yield is not 6% but slightly less due to compound interest)
3. market yield **decreases by 1%** - after six months of purchase the price of the treasury bill at 5% market yield is HUF 9756.75 / piece. So 10 660 pieces worth HUF 103 421 545, i.e. the realised annual yield for half a year is **6.73%**

advantages

- held until maturity the discount treasury bill provides fixed yield
- possibility to earn interest similar to a term deposit, while in case you need to sell the investment before maturity there is no “break fee”, the price is based on the actual market yield.
- if treasury bills are bought with a longer tenor than intended you may realise better yield when selling before maturity (in case market yield decreased in the meantime)
- liquid instrument, the investment may be mobilized anytime

risks

- if you buy securities with longer tenor than you intend to invest the realised yield is uncertain
- if you have to sell the treasury bills before maturity, its value may be less than at time of purchase, i.e. the realised yield may be negative. This may occur if the sale is very shortly after the purchase relative to the tenor and/or the market yield increases significantly over the tenor
- discount treasury bills bear the risk of default of the Hungarian State. In case of default the resulting loss of capital may be unlimited
- under extreme market circumstances (e.g. in November 2008) the market for government papers may be frozen for a short time. In such a case these securities cannot be sold or only at a very high yield level, which may cause significant losses or liquidity problems.
- chapter I/ entitled “Risk Factors” of “K&H Treasury Handbook of Market Risk Management” lists those risks that do not originate exclusively from the nature of the product described here, but rather, from other factors.