Zero Rate Return Indices (ZRR Indices)

The ZRR Index is a measurement of the total return from a synthetic portfolio investing in a constant maturity security. The constant maturity securities are derived from the ThaiBDC's **zero coupon yield curve**. The curve which relates the yield on a security to its time to maturity, is based on the quoted bidding yields on government bond and treasury bills by primary dealers. The index base date is **January 02, 2002** and all ZRR indices are set to **100**.

Eight ZRR indices currently available include:
- 1 month ZRR index
- 3 month ZRR index
- 6 month ZRR index
- 1 year ZRR index
- 2 year ZRR index
- 3 year ZRR index
- 4 year ZRR index
- 5 year ZRR index

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1 day total return for holding 1 year constant maturity security = (Price of Synthetic T-Bill sold today) / (Price of Synthetic T-Bill bought today)

1yrZRR d1 = 100

$$\text{1yrZRR d2} = \text{1yrZRR d1} * [\ (1 + ZR_{d1}(365/365))^{(365/365)}\ ] / [(1 + ZR_{d2}\ ((365-\Delta d)/365))^{((365-\Delta d)/365)}\ ]$$

$$\text{1yrZRR d}_n = \text{1yrZRR d}_{n-1} * [\ (1 + ZR_{d(n-1)}(365/365))^{(365/365)}\ ] / [(1 + ZR_{d(n)}\ ((365-\Delta d)/365))^{((365-\Delta d)/365)}\ ]$$

Where　　　d_n = day n

　　　　　$ZR_{day(n)}(TTM)$ = Zero Yield Rate at TTM on Day n

　　　　　Δd = number of day from previous working day to current day

Calculation Example of 1 year ZRR index calculation

January 02, 2002
1yrZRR = *100*

January 03, 2002
Price of 1 year (365 day) synthetic T-Bill (bought on Jan 02,2002)
$\qquad$ = par / (1+ 1yr Zero Yield/100)^(365/365)
$\qquad$ = par / (1.024857654)^1

Price of 364 day synthetic T-Bill (to be sold today)
$\qquad$ = par / (1+ 364day Zero Yield/100)^(364/365)
$\qquad$ = par / (1.024770939)^(364/365)

Return on 1 day holding 1yr T-Bill
$\qquad$ = Price of Synthetic T-Bill sold today / Price of Synthetic T-Bill bought today
$\qquad$ = [par / (1+ 364day Zero Yield/100)^(364/365)] / [par / (1+ 1yr Zero Yield/100)^1]
$\qquad$ = [(1.024857654)^1] / [(1.024770939)^(364/365)]

1yrZRR $\quad$ = 100 * Return on 1 day holding 1yr T-Bill
$\qquad$ = 100 * [(1.024857654)^1] / [(1.024770939)^(364/365)]
$\qquad$ = *100.0151665*

January 04, 2002
Price of 1 year (365 day) synthetic T-Bill (bought on Jan 03,2002)
$\qquad$ = par / (1+ 1yr Zero Yield/100)^(365/365)
$\qquad$ = par / (1.02477547469)^1

Price of 364 day synthetic T-Bill (to be sold today)
$\qquad$ = par / (1+ 364day Zero Yield/100)^(364/365)
$\qquad$ = par / (1.02491519097)^(364/365)

Return on 1 day holding 1yr T-Bill
$\qquad$ = Price of Synthetic T-Bill sold today / Price of Synthetic T-Bill bought today
$\qquad$ = [par / (1+ 364day Zero Yield/100)^(364/365)] / [par / (1+ 1yr Zero Yield/100)^1]
$\qquad$ = [(1.02477547469)^1] / [(1.02491519097)^(364/365)]

1yrZRR $\quad$ = 100.0151665 * Return on 1 day holding 1yr T-Bill
$\qquad$ = 100.0151665 * [(1.02477547469)^1] / [(1.02491519097)^(364/365)]
$\qquad$ = *100.0082752*

January 07, 2002
Price of 1 year (365 day) synthetic T-Bill (bought on Jan 04,2002)
$\qquad$ = par / (1+ 1yr Zero Yield/100)^(365/365)
$\qquad$ = par / (1.0249189205)^1

Price of 362 day synthetic T-Bill (to be sold today)
$\qquad$ = par / (1+ 362day Zero Yield/100)^(362/365)
$\qquad$ = par / (1.02480274745)^(362/365)

Return on 3 day holding 1yr T-Bill
$\qquad$ = Price of Synthetic T-Bill sold today / Price of Synthetic T-Bill bought today
$\qquad$ = [par / (1+ 362day Zero Yield/100)^(362/365)] / [par / (1+ 1yr Zero Yield/100)^1]
$\qquad$ = [(1.0249189205)^1] / [(1.02480274745)^(362/365)]

1yrZRR $\quad$ = 100.0082752 * Return on 3 day holding 1yr T-Bill
$\qquad$ = 100.0082752 * [(1.0249189205)^1] / [(1.02480274745)^(362/365)]
$\qquad$ = *100.0397554*