Inflation Indexed Bond Valuation Introduction

FinPricing

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Inflation Indexed Bond Introduction

- Inflation indexed bonds, also called inflation linked bonds or real return bonds, are bonds where the principal is indexed to a reference inflation index, such as Consumer Price Index (CPI).
- The CPI is the proxy for inflation that measures price changes in a basket of goods and services.
- The main idea of inflation indexed bonds is that investing in the bond will generate a certain real return.
- Inflation indexed bonds pay a periodic coupon that is equal to the product of the daily inflation index and the nominal coupon rate.
- Unlike regular (nominal) bonds, inflation indexed bonds assure that your purchasing power is maintained regardless of the future rate of inflation.

The use of Inflation Indexed Bonds

- An inflation indexed bond is designed to hedge the inflation risk of the bond.
- Since inflation indexed bonds offer investors a very high level of safety, their coupons are typically lower than high-yield bonds.
- It is an important vehicle for investors whose liabilities indexed to changes in inflation or wages.
- Inflation indexed bonds have favorable performance and lower volatility relative to other risk assets.
- It is favorable to retirement planning and pension funds given its inflation protection feature.
- Inflation indexed bonds are less liquid than regular bonds.

Inflation Bond

Valuation

- The present value of an inflation indexed bond is given by

$$PV(t) = \sum_{i=1}^{n} \bar{C_i}\, D_i + \overline{P_n} D_n$$

where

- t the valuation date.
- $\overline{C_i} = C * CPI(T_i)/CPI(T_I)$ the inflation adjusted coupon at payment date T_i.
- $\overline{P_n} = P * CPI(T_n)/CPI(T_I)$ the inflation adjusted principal at maturity date T_n where P is the principal.
- CPI(t) the base reference CPI at time t.
- $CPI(T_i)/CPI(T_I)$ the CPI ratio at T_i where
- T_I the issue date.
- $D_i = D(t, T_i)$ the discount factor from T_i to t.

Practical Guide

- First construct inflation curve by bootstrapping either breakeven inflation swap rates or treasury inflation protected securities (TIPS).
- Compute the base reference CPIs at the issue date and each payment date.
- Adjust the coupons and principal based on CPI ratio at each payment date.
- Discount all the coupons and principal to the valuation date.
- The bond price is the sum of all the present values.

Inflation Bond

A Real World Example

Buy Sell	**Buy**
Calendar	NYC
Coupon Type	Fixed
Coupon	0.00375
Currency	USD
Issue Date	7/31/2015
Interest Accrual Date	7/15/2015
First Coupon Date	1/15/2016
Last Coupon Date	1/15/2025
Maturity Date	7/15/2025
Settlement Date	7/31/2015
Settlement Lag	1
Day Count	dcActAct
Payment Frequency	6M
Pay Receive	Receive
Inflation Reference Index	CONSUMER PRICE INDEX US
Inflation Reference Index Level	237.14365
Notional	100

Thank You

You can find more information at

https://finpricing.com/lib/FxVolIntroduction.html