Inflation Indexed Bond Valuation Introduction

FinPricing

Summary

- Inflation Indexed Bond Introduction
- The use of Inflation Indexed Bonds
- Valuation
- Practical Guide
- A Real World Example

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.

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

Reference:

https://finpricing.com/knowledge.html