Inflation Curve Introduction

Inflation Curve

- Inflation curve is used for calculating forward value of a inflation index, such as RPI, CPI, etc.
- The construction method includes an adjustment factor to account for the observed seasonal fluctuations in the index.
- Inflation curves are the foundation for valuing inflation products, such as inflation linked bonds, inflation swaps and inflation caps/floors.
- Inflation linked securities, such as zero coupon (ZC) inflation swaps, have cash flows with a calculation rule contingent on an inflation index, either Consumer Prices Index (CPI) or Retail Prices Index (RPI).

Inflation Curve

- Inflation markets exhibit strong seasonal patterns and, thus, forward index curve should capture this behavior. Since coupon calculation rule for inflation linked securities typically specifies a lag of some months between the RPI observation and payment
- Usually inflation curve is calibrated to zero coupon inflation swaps and includes an adjustment factor to account for the observed seasonal fluctuations in RPI.
- In the UK, the inflation indices are calculated and published by the Office for National Statistics (ONS).
- A time series of RPI data has a clear and significant annual cycle of monthly seasonal fluctuations imposed on the generally observed trend of increasing RPI.

Inflation Curve

- ZC inflation swaps can be used to forecast the trend of forward RPI. However, these instruments do not provide any information about monthly fluctuations.
- Historical RPI data is used to calculate seasonal deviations from the trend in RPI and use this as the best estimate for future seasonal fluctuations
- The seasonal adjustment factors are calculated using a standard statistical procedure
- It decomposes a monthly time series into a product of a trend, a seasonal and a residual (also called irregular) component.

Inflation Curve

- The base RPI month is obtained by subtracting RPI lag from the value date month.
- All calculations hereinafter are done relative to this base month. The RPI relationship is

$$RPI(t_i) = RPI_T(t_i) \cdot S(m(t_i)) \cdot I(m(t_i))$$

- The trend is estimated from the ZC inflation swap rate as

$$RPI_T(t_k) = RPI(t_{BASE}) \cdot (1 + r_k)^{t_k}$$

Thank You

You can find more details at

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