

Inflation-linked bonds

What are inflation-linked bonds?

Inflation-linked bonds are bonds whose interest payments and principal (the payment made by the issuer at maturity) are linked to an index of inflation.

By contrast, the interest payments and principal value of conventional bonds are fixed in nominal (money) terms.

Investors in inflation-linked bonds

Inflation-linked bonds appeal to a wide range of investors. They are a natural asset class for those with inflation-linked liabilities, such as defined benefit pension funds, endowments, charities and foundations. They may also attract interest from investors concerned about unexpected increases in inflation and looking for a natural hedge against such an outcome.

According to the UK's National Association of Pension Funds (NAPF), UK defined benefit pension schemes whose future liability profile is fixed (i.e., those that are closed to new members) invested 21% of their portfolios in index-linked gilts in 2012, up from 7% in 2008¹.

While other asset classes, such as equities, commodities and property, may also act as an inflation hedge over time, their return streams are usually more volatile than those of inflation-linked bonds. Some investors may therefore prefer the certain post-inflation return offered by inflation-linked bonds.

Inflation-linked bonds are also used by fixed income investors seeking diversification within a broader bond portfolio.

¹ NAPF, "Trends in Defined Benefit Asset Allocation", July 2013.

How do inflation-linked bonds work?

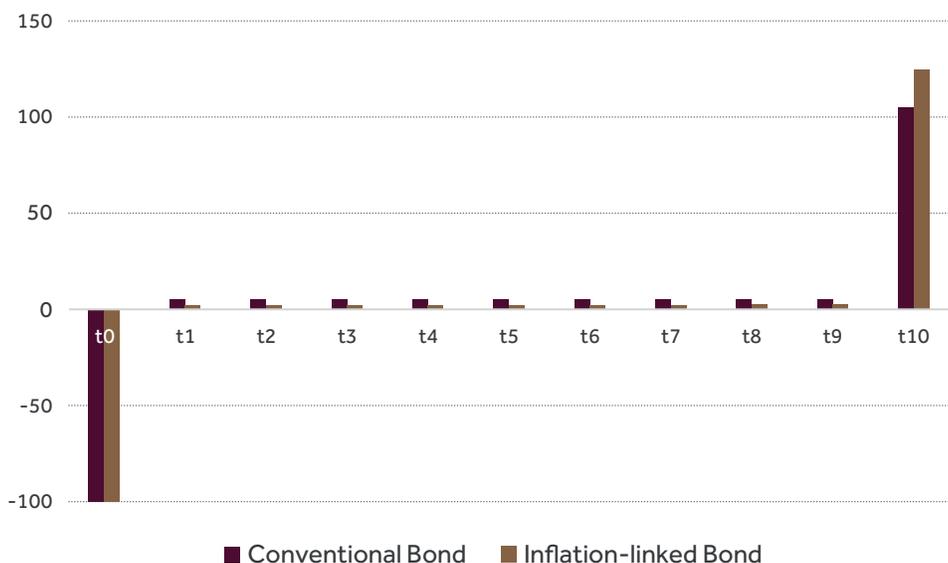
The difference between inflation-linked and conventional bonds is illustrated in the table and chart below, in which we compare two bonds for illustrative purposes.

One, a conventional bond, has a fixed nominal value of 100 at maturity and a 5% annual interest payment (or “coupon”) and the other, an inflation-linked bond, has a principal value and a 2% annual coupon that are both indexed to inflation.

Both bonds cost 100 at issue (represented by time Y0) and produce cash flows in the ten subsequent years (Y1-Y10). The annual interest payments (5% a year) and the principal value at maturity of the conventional bond (100) are fixed at the time of issue. But the interest payments and the principal value at maturity of the inflation-linked bonds increase with inflation over the life of the bond.

Cash flows on conventional and inflation-linked bonds

Time	Conventional bond with 5% annual coupon	Inflation-linked bond with 2% annual coupon, 2% inflation
Y0	-100	-100
Y1	5	2.04
Y2	5	2.08
Y3	5	2.12
Y4	5	2.16
Y5	5	2.21
Y6	5	2.25
Y7	5	2.30
Y8	5	2.34
Y9	5	2.39
Y10	105	124.34



Source: FTSE Russell, for illustrative purposes only. Inflation is assumed to be constant and indexation lag is ignored.

So the purchaser of a conventional bond knows with certainty what cash flows to expect in nominal terms, but not what the real (post-inflation) value of those cash flows will be (since future inflation levels are unknown). By contrast, the purchaser of the inflation-linked bond knows what real return to expect, but not what the cash flows will be in nominal terms.

Real and nominal returns from conventional and inflation-linked bonds

Type of bond	Real return	Nominal return
Conventional	<i>Known ex post</i>	<i>Known ex ante</i>
Inflation-linked	<i>Known ex ante</i>	<i>Known ex post</i>

For positive expected inflation rates, the real yield on an inflation-linked bond will always be lower in headline terms than the yield on a conventional bond of the same issuer and the same maturity. This is because an investor in the conventional bond requires a higher nominal yield to compensate for future inflation and inflation risk².

There is a small lag between the time at which inflation-linked bonds' cash flows are made and the reference point for the underlying inflation index. For most global inflation-linked bond markets the lag is three months (i.e., bonds' interest and principal payments are calculated on the basis of the inflation index from three months earlier). UK index-linked gilts issued before 2005 have an indexation lag of 8 months.

Inflation-linked bonds are issued by a number of sovereign borrowers, including the US, the UK, Australia, France, Italy, Germany, Canada, Japan, Mexico, Turkey, Brazil, South Africa, Spain, Sweden, Greece and Israel, as well as by government agencies, supra-national and corporate issuers.

These issuers use a representative local inflation index for the calculation of interest and principal payments. For example, cash flows on US Treasury Inflation Protected Securities (TIPS) and Australian Treasury Indexed Bonds are linked to the Consumer Price Index (CPI) in the US and Australia, respectively. Cash flows on UK index-linked gilts are linked to the UK Retail Price Index (RPI).

Break-even inflation rates

The relative attractiveness of conventional and inflation-linked bonds can be assessed via a measure called the break-even inflation rate.

The break-even inflation rate is the average annual inflation rate at which investors would be indifferent between holding a conventional bond and an inflation-linked bond of the same issuer and the same maturity.

If an investor expected inflation to be higher over the period than the break-even rate, he would prefer to hold the inflation-linked bond. If the investor expected lower inflation than the break-even rate, he would prefer the conventional bond. The break-even inflation rate is therefore a useful indicator of the market's expectations of future inflation.

² In the case of deflation (negative inflation), the real yield on inflation-linked bonds could be expected to exceed the nominal yield on conventional bonds. However, some issuers of inflation bonds offer a deflation floor, guaranteeing that the principal value of the bonds will not fall below the initial amount. This provides some protection to investors against falling prices.

The FTSE Actuaries UK Index-Linked Gilts Index Series

The UK was one of the first sovereign borrowers to issue inflation-linked bonds (called "index-linked gilts") and, as at September 30, 2014, this segment represented a quarter by nominal value of the UK government bond market³.

Initially only pension funds and institutions writing pension business were allowed to own index-linked gilts, although this restriction was removed a year after the first bond was issued⁴.

The FTSE Actuaries UK Index-Linked Gilts Index Series is the most widely used and representative set of benchmarks for UK inflation-linked bonds. The series includes indexes that measure the performance of the index-linked gilts market as a whole, as well as the performance of individual maturity segments of the market. The indexes are calculated on a price or a total return basis, and FTSE also provides standard analytics such as yield or duration.

FTSE Actuaries UK Index-linked Gilts Indexes

- All stocks (gilts with all outstanding terms), excluding rump stocks and convertible gilts
- Gilts with an outstanding term of up to 5 years
- Gilts with an outstanding term of over 5 years
- Gilts with an outstanding term of over 10 years
- Gilts with an outstanding term of 5 - 15 years
- Gilts with an outstanding term of up to 15 years
- Gilts with an outstanding term of over 15 years
- Gilts with an outstanding term of 15 - 25 years
- Gilts with an outstanding term of 5 - 25 years
- Gilts with an outstanding term of over 25 years

EuroMTS Inflation-Linked Bond Indexes

The EuroMTS Inflation-Linked Indexes (eMTX[i]) comprise inflation-linked bonds issued by eurozone governments of at least €2 billion in nominal size. The index series includes sub-indexes classifying bonds by their maturity range or by the underlying inflation reference (for example, the EU Harmonised Index of Consumer Prices or national inflation indexes).

Real yield indexes

Investors in inflation-linked bonds use bonds' real yields as a primary valuation measure. FTSE calculates real yield indexes for each maturity sector of the FTSE Actuaries UK Index-Linked Gilts Index Series. As the real yield of an index-linked bond depends upon the rate of inflation over the bond's life, these indexes are calculated with assumed future inflation rates of 0%, 3%, 5% and 10%.

³ See the *FTSE Insight* on the FTSE Actuaries UK Gilts Indices.

⁴ See <http://www.dmo.gov.uk/index.aspx?page=gilts/indexlinked#keyevents> for key events in the history of the index-linked gilts market.

Price sources for inflation-linked bond indexes

Compilers of fixed income indexes use a range of pricing sources, including data feeds from trading venues, prices contributed by a single dealer or a panel of dealers, and data from specialist third-party evaluators. The price source chosen for a particular index series primarily reflects whether trading in the underlying bonds takes place at a centralized venue or in the bilateral, over-the-counter market⁵.

In the case of the FTSE Actuaries UK Index-Linked Gilts index series, prices are sourced directly from the gilt market's primary dealers (called gilt-edged market makers or "GEMMs") and thereby provide a transparent link to trading activity in the underlying market.

In return for various privileges (participating directly in gilt auctions, dealing directly with the UK's Debt Management Office, or "DMO", in the secondary market, and having the ability to "strip" gilts), GEMMS sign up to a series of obligations. These obligations include playing an active role in the issuance, distribution and marketing of UK government debt and also the provision of accurate pricing information in gilts.

The EuroMTS Inflation-Linked Indexes are calculated using real-time, executable quotes from central electronic trading venues, the MTS interdealer platforms. Similarly to the FTSE Actuaries UK Index-Linked Gilts Index Series, market data, rather than single-source or theoretical (evaluated) bond prices, create the index price inputs.

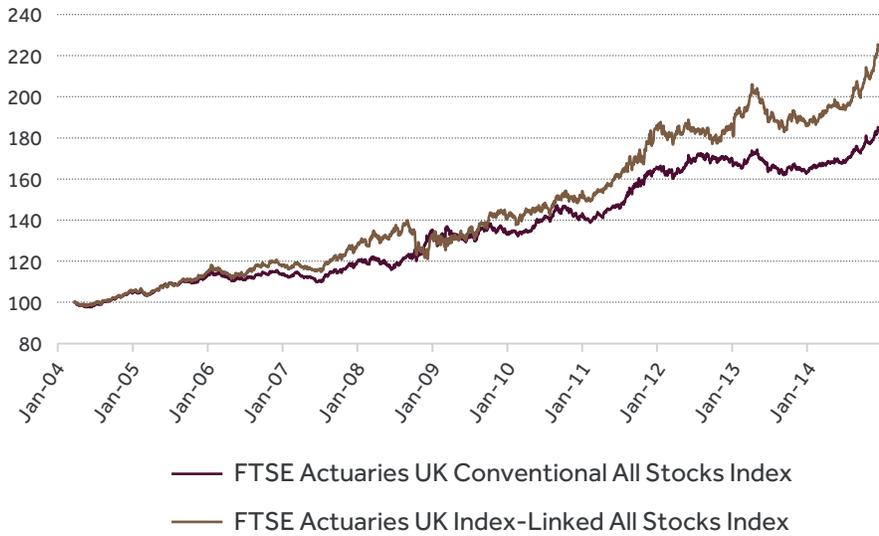
FTSE calculates both end-of-day and mid-day versions of the indexes within the UK Index-Linked Gilts Index Series. The end-of-day indexes are based on the reference prices published by the DMO, while mid-day indexes use composite intraday prices compiled by the DMO.

Performance and yields

The total return performance from March 2004 to December 2014 of the FTSE Actuaries UK Index-Linked All Stocks Index is illustrated in the chart below. The total return performance of conventional gilts (in the form of FTSE Actuaries UK Conventional All Stocks Index) is shown for comparison. Over the period index-linked gilts have outperformed their conventional counterparts.

⁵ See the FTSE Insight, "An Introduction to Bond Indices".

Total return performance of conventional and index-linked gilts

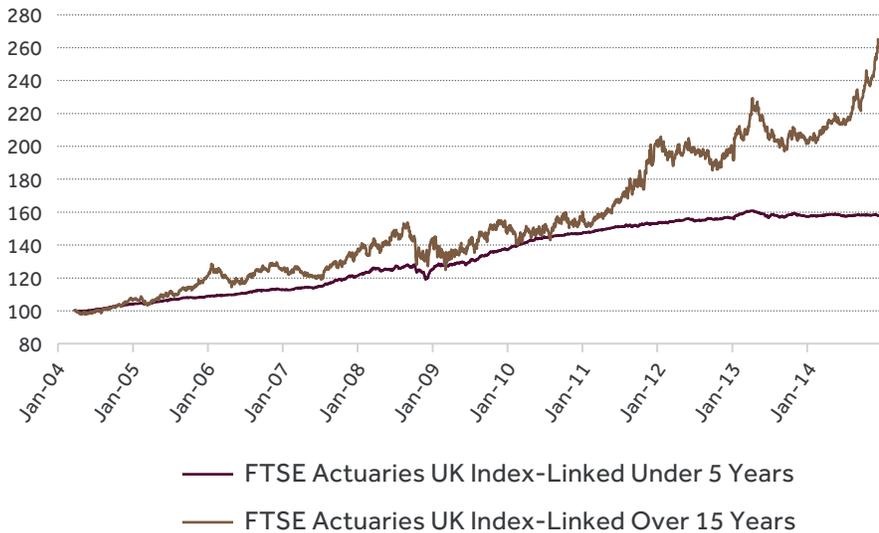


Source: FTSE Russell, data as at December 16, 2014. Index values shown are from March 17, 2004 to December 16, 2014. Index values are rebased to 100 on March 17, 2004. Past performance is no guarantee of future results.

Over the period from March 2004 to December 2014 longer-dated index-linked gilts outperformed their shorter-dated counterparts, reflecting a downward shift in the index-linked market's real yield curve and the greater duration (sensitivity to real yield movements) of longer-dated bonds.

In the chart below we show the total return since 2004 of the Under 5 year and over 15 year sub-indexes of the FTSE Actuaries UK Index-Linked All Stocks Index Series.

Total return performance of under 5 year and over 15 year index-linked gilts



Source: FTSE Russell, data as at December 16, 2014. Index values shown are from March 17, 2004 to December 16, 2014. Index values are rebased to 100 on March 17, 2004. Past performance is no guarantee of future results.

The real yield of the FTSE Actuaries UK Index-Linked All Stocks Index over the period from March 2004 to December 2014 is shown in the chart below. Real yields have fallen steadily during the period, moving into negative territory from 2011 onwards. A negative real yield on an inflation-linked bond means that investors are willing to accept a below-inflation return on the bond in return for the certainty of receiving an inflation-indexed future income stream.

Real yield of FTSE Actuaries UK Index-Linked All Stocks Index (at 3% assumed inflation)



Source: FTSE Russell, data as at December 16, 2014. Index values shown are from March 17, 2004 to December 16, 2014. Index values are rebased to 100 on March 17, 2004. Past performance is no guarantee of future results.

Inflation-linked bond indexes

Indexes of inflation-linked bonds, such as the FTSE Actuaries UK Index-Linked Gilts Index Series and the EuroMTS Inflation-Linked Indexes, provide a transparent and rules-based benchmark of performance for this sector of the fixed income market. Inflation-linked bonds are an important asset class for a wide variety of investors, including those seeking to hedge inflation-linked liabilities and those seeking diversification effects within a fixed income or balanced portfolio.

For more information about our indexes, please visit ftserussell.com.

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