

AF4 2023/2024

Asset Classes: Gilts and Bonds

Part 1: Tradeable debt

The international Bond markets are a vital part of the world's financial system. In the 1990's the Democrat adviser James Carville said,

"I used to think if there was reincarnation, I wanted to come back as the President or the Pope. But now I would like to come back as the Bond market. You can intimidate everyone"

That was proved true with what happened after the mini budget of September 2022!

Most people know what the stock market is. Every night many news bulletins announce the closing price of the FTSE 100. If there is a large fall in the market, it's headline news. By contrast the Bond market normally stays in the background yet it's arguable that movements in that market have a far bigger influence on the economy than equity markets.

The Bond markets:

- Determine the rate of interest that nations and companies must pay to borrow.
- Can punish nations who are seen to be mismanaging their economies.
- Influence annuity rates.
- Affect the liabilities of pension funds
- Can affect mortgage rates
- Affects rates offered to savers
- Can give a guide to future economic trends
- Can influence the performance of equity markets

Perhaps because the Bond market has historically not been that volatile it is seen as less exciting than equity markets and often ignored by investors. This is a grave error!

It's a large subject it will be broken down into three parts:

Part one: The concepts of Bonds and their key performance measure of GRY
Part two: The workings of the Bond markets
Part three: Bonds for investors

The milestones for this part are to understand:

- The characteristics of a Bond and how it differs from fixed interest deposits.
- The terminology of bond investments.
- How to calculate Gross Yield to redemption
- Why this measure is important.

The characteristics of a bond

“Bond” is the most misused term in the financial services dictionary. When a bank offers a fixed rate “Two Year Bond” it is still a deposit account as the saver can normally get the money back before the end of the term although there will be a loss of interest. A Bond in its true sense is a **tradeable debt** or IOU.

Tom borrows £10,000 at 5% interest from Dick. Tom agrees to pay back the loan in full in seven years’ time. Three years later Dick needs cash but Tom says he will only pay him back in four years’ time so Dick sells the loan to Harry.

Tom now pays the interest to Harry and will pay him £10,000 at the end of the loan.

This illustrates the key characteristics of a bond.

- It is a loan for a fixed period.
- The borrower agrees to pay a fixed rate of interest.
- The loan will only be repaid by the borrower at the end of the term.
- The loan can be traded on the secondary market.

Bonds can be issued by companies or Governments. The former are referred to as **Corporate Bonds** and the latter as “**Sovereign Debt**” Bonds issued by the UK Government are known as **Gilts**.

The way that Bonds operate is basically the same regardless of who the borrower is, but we will focus on Gilts to get the basic principles.

The basic operation of a Gilt

This is a fictitious example but it illustrates the key points.

On March 1 2010 the Government issued a 20 year Gilt carrying an interest rate or coupon of 4%. For every £100 invested at issue, an investor will get the following:

- Every 6 months a gross payment of £2 starting on September 1 2010.
- Repayment of £100 together with the last payment of £2 will be made on March 1 2030
- In total, they would have received £80 in interest payments plus a full return of their capital.

The Government will not repay the holder before March 1 2030 but the gilt can be traded on the secondary market. The buyer is purchasing the right to receive a fixed income and the right to receive the loan repayment at maturity.

Individual and corporate investors will have lent different amounts so in practice all measures of bond performance use £100 as the par value. Put another way the market price tells you how much it costs to buy £100 of debt.

As with any market the price will be set by supply and demand and in turn this will be influenced by:

- The relationship between the coupon and current interest rates. In the previous example if a rate of 4% rate was higher than market rates the price will be higher than £100. Effectively the owner of this Gilt is getting an income of £4 a year so a buyer is likely to pay more than the £100 that will be repaid in 2030. Conversely if rates were to rise above 4% the price would tend to fall below £100.
- The time to redemption date. Since £100 will be repaid in March 2030, the market price will gravitate towards this as March 2030 approaches.
- The credit worthiness of the borrower. The UK government has a high credit rating and is unlikely to default. In extremis it could print money. Countries in the Eurozone cannot do that so those with weak economies are seen as a higher risk. Other countries with less stable governments and economic systems are more likely to default particularly if the bonds are denominated in another currency such as the dollar.
- The investor's view of future inflation. With most bonds, the monetary amount of the interest and capital repayments are fixed so inflation will reduce the real returns on the bond.

Gross Yield to Redemption

With a Gilt/Bond the coupon and redemption date are fixed but the market price will vary. This means that if coupon is 4% but an investor has paid £120 for a £100 unit, they won't be getting a 4% return on their investment of £120. The true interest return will be 3.33%. The fact that only £100 will be repaid at redemption also needs to be factored in.

The total return from a gilt will be:

The interest payments that will be received plus or minus the gain or loss resulting from the difference between purchase and redemption price.

This can be expressed in percentage terms by calculating the **Gross Yield to Redemption (GYR)**. It is sometimes referred to as **Yield to Redemption or YTR**. It is the key measure in assessing whether a Gilt on the secondary market offers a reasonable value for the investor.

To calculate them we need to know three things:

- The coupon
- The market price
- The time remaining to redemption.

Here are these details for three gilts recorded in December 2022

Redemption date	Coupon	Market Price
7 March 2025	5%	£103.69
7 September 2034	4.5%	£112.27
7 December 2055	4.25%	£117.10

Before going on you need to be aware of the distinction between **clean price** and **dirty price**.

The March 2025 issue will pay interest on March 7 and September 7. If it is sold on 7 July four months interest will have accumulated, about £1.67 for each £100. The buyer must pay this to the seller in addition to the market price. The price without the accumulated interest is the clean price. The price with the interest is the dirty price. In the table market price refers to the clean price.

In this table two things are obvious. The clean price of all of them is higher than the £100 redemption value. That means that anyone buying them on that date will make a capital loss if they are held to redemption.

From this information it's possible to calculate two key returns:

- Daily or running yield
- Gross Yield to Redemption. This is also referred to as Yield to Redemption. (YTR)

The formula for running yield is:

Coupon/Clean Price x 100

Referring to the previous table the running yields based on December 2022 prices would be:

March 2025

$$5/123.33 \times 100 = 4.82\%$$

September 2034

$$4.5/£112.27 \times 100 = 4\%$$

December 2055

$$4.25/£117.10 \times 100 = 3.63\%$$

IMPORTANT POINT In both J10 and AF4 you should work out all returns to two decimal places.

If the clean price is greater than £100 the running yield will always be lower than the coupon.

Running yield is not that useful a measure as it ignores the gain or loss that will be made if it is held to redemption. Yield to redemption does that. There are different ways to calculate this but for the exam the simplified or Japanese method will be used.

Taking the 2034 gilt the running yield has been calculated as 4%

If held to redemption there will be a capital loss of £12.27. Assuming there were exactly 12 years to redemption this is an average loss of £1.02 a year.

This is then divided by the clean price and multiplied by 100. Therefore:

$$£1.02/£112.27 \times 100 = 0.91\%$$

This is then subtracted from the running yield so 4% less 0.91% = 3.09%.

The full formula for YTR when the clean price is higher than £100 is:

$$\text{Running yield LESS } \frac{\text{Capital loss/number of years to redemption} \times 100}{\text{Clean Price}}$$

In practice you should tackle the calculation in this order:

1. Calculate running yield
2. Calculate capital loss if held to redemption
3. Divide this by number of complete years to redemption.
4. Divide this by the clean price and multiply by 100 to get a percentage.
5. Subtract this from the running yield.

Now look at this gilt, details taken July 7 2023

Redemption date	Coupon	Market Price
31 July 2033	0.875	£70.08

The clean price is below £100 so the formula is:

$$\text{Running yield PLUS } \frac{\text{Capital gain/number of years to redemption} \times 100}{\text{Clean Price}}$$

$$\text{Running yield } 0.875/£70.08 = 1.25\%$$

$$\text{Gain is } £100 - £70.08 = £29.92$$

$$\text{Assume 10 complete years to redemption } £29.92/10 = £2.92$$

$$£2.92/70.08 = 4.17\%$$

$$\text{GRY} = 1.25\% + 4.17\% = 5.42\%$$

Market Price and GRY

A fundamental point about Bonds is that the market price and Gross Yield to Redemption move in opposite directions. If the price increases the yield falls and vice versa.

This table shows the performance of the gilt maturing in July 2038 with a coupon of 4.75%.

Date	Clean Price	Gross Yield to Redemption
December 2008	£112.53	4.02%
June 2017	£151.76	1.81%
November 2019	£162.44	1.11%
June 2020	£172.10	0.70%
December 2022	£115.39	3.49%
July 2024	£97.83	5%

This is just down to mathematics but has a major impact on the cost of government borrowing and the rate lenders will charge to their customers.

Whilst the government sets the coupon it is the market that sets the price and therefore the GRY. In June 2020 the government could, theoretically, have borrowed at a rate of 0.7% to 0.9% for 18 years. Today it would have to issue a new gilt maturing in 2038 at a rate of 5%.

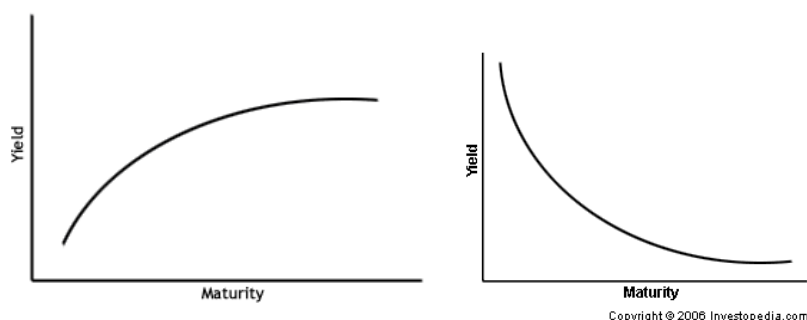
From an investor's perspective the current yield of 5% reflects a risk free return so it would be illogical to invest anywhere else if they were happy with a 5% return and would only seek another investment if they felt there was a good chance of the return being higher than this.

In the years between 2017 and 2022 GRY was low so investors sought out other assets which is one of the reasons that equities and property values rose. They were willing to take a greater risk because gilts offered a meagre return.

Yield Curves.

Under most circumstances the longer the term of a loan the higher the rate the lender will demand. Bonds have different remaining terms and the relationship between YTR and term to redemption can be plotted on graphs as follows.

In the first, the YTR increases as the term increases. This is called a **normal distribution curve** as we would expect investors to demand a higher return the longer the money is invested. In the second one the yield falls as the term increases. This is called a **reverse curve**.



The standard explanation for the yield curve inverting is that investors are more concerned about short term rather long term inflation. This should still be included in your answer although the full explanation is a little more complicated!

For the curve to level or invert, yields on the short term (the left hand side) must rise and long term yields (the right hand side) must fall.

If short term yields rise then prices must have fallen which in turn must have been caused by a reduced demand. This is likely to be because interest rates have risen (or investors believe they are about to rise) and the coupon becomes less attractive.

If long term yields fall then the price must have risen. Buying gilts enables investors to lock into future returns. This makes them attractive if investors believe that returns on equities are going to fall. This will push up demand which in turn increases prices and pushes down the yield.

An inverse yield curve has been cited as an early warning indicator of a future recession. It can also show that the market does not believe that inflation is unlikely to rise in the future.

The yields on a selection of Gilts (December 2022 and July 2023) are as follows

	December 2022	July 2023
September 2024	1.67%	5.43%
September 2034	3.23%	4.44%
December 2042	3.56%	4.53%
December 2049	3.52%	4.74%
July 2065	3.18%	4.14%

Plotted on a graph the December 2022 curve would resemble the normal shape. In July 2023 the curve would fall between 2024 and 2034 but then there is a slight increase as the term gets longer. In both cases the yield dips for the 2065 maturity. These ultra long gilts are popular with final salary pension funds and demand for them may have increased the price and reduced the yield.

Another way of measuring the difference is by calculating the number of **basis points** between two gilts. A basis point is equivalent to 100th of 1%. For example there was (rounding down) 29 basis points between the 2034 and 2049 maturities in December 2022.

Bearing in mind that a 1% difference represents 100 base points 29 points is a very narrow spread This widened slightly in July 2023 so a very small increase.

Spreads can also be used to compare the yield on two bonds from different borrowers but with the same term. Going back to the 10 year Bond table the spread between UK and Germany in July 2023 was 155BP whereas in June 2020 the spread was 63 BP, that is a widening of 92 points.

That concludes this part so you should now understand

- The characteristics of a Bond and how it differs from fixed interest deposits.
- The terminology of bond investments.
- How to calculate Gross Yield to redemption
- Why this measure is important.