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Topic 1: Investing in Exchange-traded AGBs

This module explains how you can measure the income Exchange-traded AGBs pay and how their market price can change. We also introduce some bond trading concepts.

Modules 3 and 4 look specifically at the two AGB types - Exchange-traded Treasury Bonds (TBs) and Exchange-traded Treasury Indexed Bonds (TIBs).

Module 5 will equip you with the practical knowledge to buy and sell Exchange-traded AGBs.

We also have a course on [corporate bonds and hybrids](#) that you may also find useful.



What are Exchange-traded AGBs?

Australian Government Bonds are debt securities issued by the Australian Government. Exchange-traded AGBs offer a convenient and readily accessible way for investors to invest in Australian Government Bonds.

The holder of an Exchange-traded AGB beneficially owns an interest in an Australian Government Bond in the form of a CHES Depository Interest (CDI).

The CDI gives the holder all the economic benefits (including payments) attached to the interest in the Australian Government Bond over which the CDI has been issued.

(CHES is an ASX computer system that manages the settlement process and records the ownership interest of holders of CDIs over Exchange-traded AGBs.)



Why invest in Exchange-traded AGBs?

A secure, regular and stable income stream - Exchange-traded AGBs provide you with a regular income stream. They have one of the lowest credit risks of any financial product.

Reduced risk through diversification - Exchange-traded AGBs may help you reduce risk and diversify your investment portfolio.

Traded on	ASX
Income from	Australian Government



A highly liquid investment - Being traded on ASX, Exchange-traded AGBs can be sold at any time the ASX market is open. This means your money is not locked away like in a term deposit. Investing in an Exchange-traded AGB exposes you to potential profit or loss in line with changes in the price of the Exchange-traded AGB.

Hedge against inflation - Treasury Indexed Bonds have their face value (and coupons) adjusted for movements in the Consumer Price Index (CPI).

To achieve these outcomes you can expect to receive a lower level of return than from an investment that exposes you to a greater level of risk.

Why aren't all AGBs the same?

The Australian Government issues bonds periodically according to their funding requirements.

In order to manage its own liquidity and risk, the Government issues bonds with different maturities and coupons.

The coupon rate offered on an AGB usually reflects interest rates prevailing at the time of issue.

There is a range of AGBs available with different coupon rates and maturities.

AGB type	Coupon rate	Maturity date
TB	4.75%	21-October-2015
TB	4.75%	15-June-2016
TB	6.00%	15-February-2017
TB	4.25%	21-July-2017
TB	5.50%	21-January-2018
TIB	4%	20-August-2015
TIB	4%	20-August-2020
TIB	1.25%	21-February-2022
TIB	3%	20-September-2025
TIB	2.5%	20-September-2030

Topic 2: Coupon rate and yield to maturity

The coupon rate

The basic measure of return for an AGB is the coupon rate. This is the income it pays expressed as a percentage of its face value.

The coupon rate is one measure investors might instinctively look to when making an assessment of which AGB to purchase.

But there is a more useful measure.

Yield to maturity is important

Yield to maturity (YTM) is a total return measure. YTM assumes you buy the Exchange-traded AGB on market and hold to maturity. It measures the combined effect of the income you receive from the time you purchase the security, PLUS any potential capital gain or loss. It assumes that coupon interest paid over the life of the Exchange-traded AGB is re-invested at the same rate as the 'yield to maturity'.

By using YTM you can compare AGBs that might be trading at different prices and have different coupon rates.

YTM for each AGB is displayed on the price tables on the ASX website and may be available from your broker's market information page.

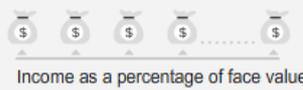
Why YTM can differ from coupon rate

Although AGBs are issued with a face value of \$100, their market price can vary significantly.

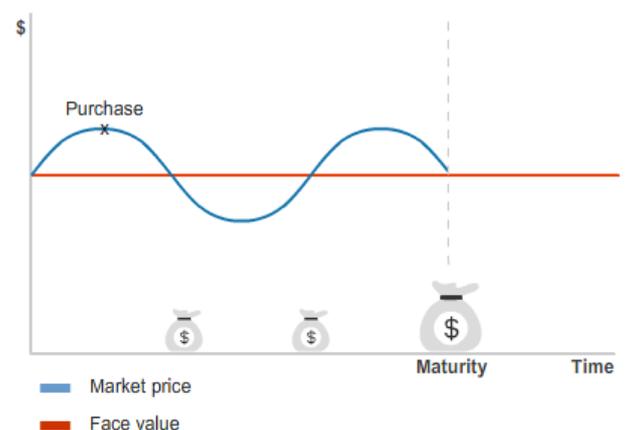
Whether you pay a market price for an AGB which is at a premium or discount to face value will determine whether your yield to maturity is higher or lower than the coupon rate.

Suppose you buy an Exchange-traded AGB for more than its face value, you still receive the same coupons as if you had paid face value. So, in this example, your income, as a percentage of your actual outlay, will be lower than the AGB's coupon rate.

$$\begin{array}{ccc}
 \$100 & \times & \frac{4.50}{100} & = & \$4.50 \\
 \text{Face value} & & \text{Coupon rate} & & \text{Coupon payment}
 \end{array}$$

Rate of return	Reflects
Coupon rate	 Income as a percentage of face value
Yield to maturity	 Income + Payment of face value

If you purchase for a price above face value you receive coupon payments plus you will make a capital loss at maturity leading to a lower yield to maturity than the coupon rate.



You would also incur a capital loss if you then held the AGB till maturity (your capital gain/loss will be the difference between the price you paid to purchase on market and the face value you receive at maturity.)

The net effect means YTM will be lower than the coupon rate.

YTM for TB and TIBs will be different

Calculating YTM for a TB does not provide an inflation adjusted figure.

However the YTM for a TIB does provide an inflation adjusted figure.

YTM calculations for TIBs do include an assumption about future rates of inflation as their final face value is unknown.

When you calculate the real YTM for a TIB the amount may look quite low - if you add inflation rate expectations, you will get a YTM that is a better comparison with that of a TB.

If you are mathematically inclined and are interested in the detail in the assumptions and calculations of yield to maturity the [Reserve Bank has a useful webpage](#) on the subject.

Assume inflation at 2%	Yield to maturity	Return in real terms
TIB	0.4	0.4
TB	2.5	0.5

Topic 3: Why AGB prices move

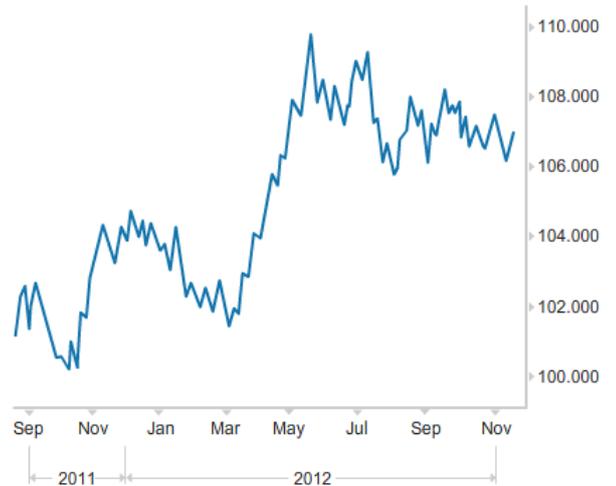
What drives AGB prices?

AGB prices go up and down.

The price buyers and sellers will be willing to accept is influenced principally by interest rate expectations - which in turn are affected by a range of economic considerations.

Also relevant are

- time to maturity, and
- eligibility to receive the next coupon.

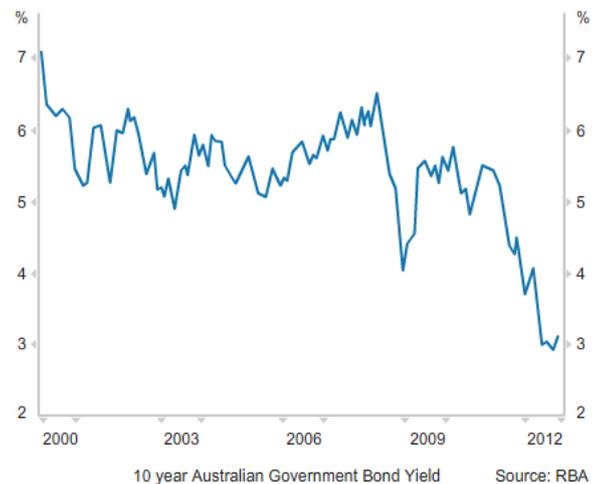


AGB prices and interest rates

AGB prices are highly sensitive to changing views on the likely direction of interest rates.

If there is an expectation that interest rates will rise, investors will demand higher yields. If the expectation is the opposite, investors are more likely to accept lower yields.

The yield to maturity of each AGB adjusts to these revised expectations by a change in its market price.



How does the market price of an AGB affect its yield?

The coupon rate of an AGB is fixed from the time of issue.

A fall in the market price of an AGB combined with a pre-set level of income payable on the AGB (the coupon) will result in a *higher effective yield*.

A rise in the market price of an AGB will result in a *lower effective yield*.

This inverse relationship can be counterintuitive but is important to understand.



Example of interest rates rising

Assume a 5 year Exchange-traded Treasury Bond (TB) has a fixed coupon rate of 4.25%. Given its face value of \$100, the TB holder gets \$100 back at maturity plus \$4.25 in income annually.

If the 5 year TB interest rate rises to 5.25% that TB is now less attractive.

Prospective investors in that TB will now only be prepared to pay a market price that will result in a yield of 5.25%.

The market price for the TB will fall so that its price equates to a yield to maturity of 5.25%.

Will the price move up or down to match market expectations?



When interest rates fall

If expectations are that interest rates will fall, TBs will become more attractive. As investors bid up the price of TBs, their yields will fall until they reach the new equilibrium expectation.

For example, suppose the market rate for a 5 year TB falls to 3.25% and a 5 year TB has a coupon rate of 4.25%.

You might be prepared to pay a market price higher than its face value of \$100 provided the yield to maturity is not less than 3.25%.

Your coupon payments will still be \$4.25 (coupon rate multiplied by face value) but you will have paid more than face value.

If you hold to maturity you will incur a capital loss as you will only receive \$100 but you will have paid more than \$100 to buy the TB.

In this way the lower market price of the TB reflects the yield to maturity of 3.25%.

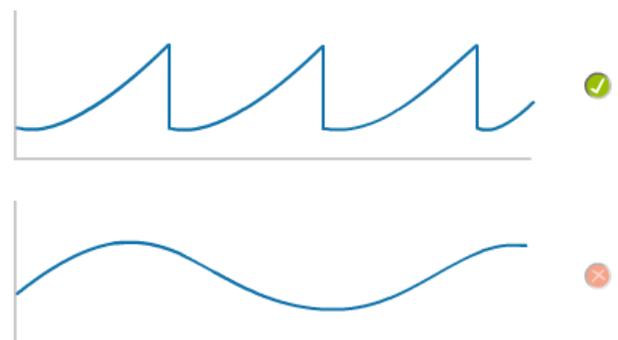
- Current yield is 4.24%
- Expected new yields are 3.75%

Which way will prices move?

- Up
 Down

Accrued interest affecting price

Coupon payments affect the market price of AGBs - however the price adjustment is incremental over the period between coupon payments.



The coupon payment is increasingly factored into the market price of the AGB as the payment date approaches.

All things being equal, at the beginning of trading on the ex-interest date, the price generally adjusts downwards by the amount of the coupon payment.

The ex-interest date is important to understand. **To be entitled to the current coupon payment you must hold the AGB before the ex-interest date.** If you purchase the AGB on or after the ex-interest date you are not entitled to the current coupon payment.

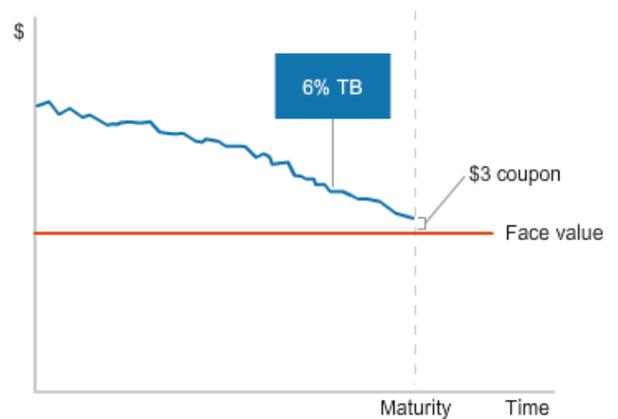
Maturity approaching affects market price

As the maturity date for an Exchange-traded AGB approaches, its market price can be expected to trend towards its face value.

For those AGBs that have been trading at a significant premium to their face value this change in market price could be significant.

In the graph to the right, the 6% TB trading above face value would indicate that its YTM is lower than the coupon rate. Therefore the price of the bond will fall as it approaches maturity.

In this instance, the fall in the price is compensated by the income you receive from the AGB's coupon rate.



Topic 4: The yield curve

We have learnt that each AGB has a different coupon rate and maturity date.

These features are key reasons why different series of AGBs will trade at different market prices to each other.

We also know that as the market price for an AGB changes, its yield to maturity will change.

We can compare the yields to maturity of all AGBs by graphing their different yields to create a “yield curve”.

A yield curve is a chart that plots YTM's against maturity dates.

The yield curve is a fluid representation

The yield curve is not a picture of historical price movement. The yield curve reflects AGBs' current market price via their yield to maturity.

Because YTM takes account of current market prices, the shape of the yield curve is fluid and will change as the market price for AGBs change.

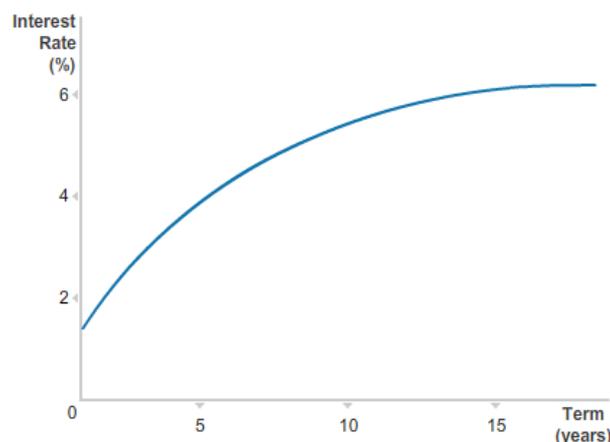
The shape of the yield curve tells a story about the market's views on interest rates, economic growth and inflation.

The normal yield curve

If the market expects interest rates to be stable or rise in the medium to long term, this will be reflected in long term interest rates being higher than short term interest rates.

A normal yield curve is formed as a result of investors being reluctant to invest at long term interest rates due to an expectation of interest rates rising in the future. Instead, investors invest in shorter dated interest rates. The combined effect is for longer dated interest rates to rise relative to shorter dated interest rates creating an upward sloping yield curve.

Therefore, the shape of the yield curve throws light on the market's expectations for future interest rates.

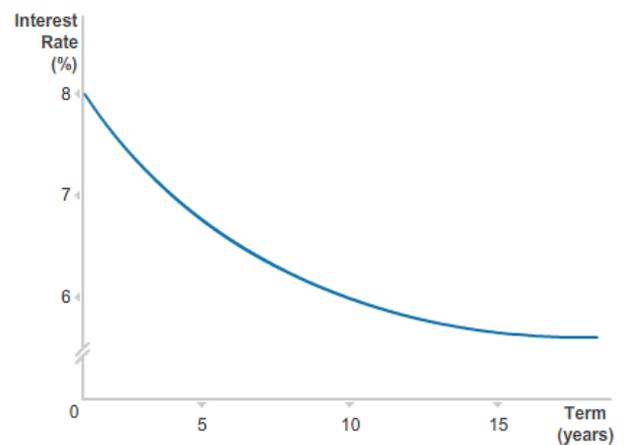


The inverted yield curve

Again, the shape of the yield curve tells a story about the market's expectations. If investors are concerned that interest rates will fall they will be keen to invest in longer dated bonds offering a higher yield to maturity than those they expect to be issued in the future.

Accordingly demand for longer dated bonds will be high, their price will rise and their yields to maturity will fall.

The result is an inverted yield curve.



Topic 5: AGB investing

In this module you have learnt that:

- Exchange-traded AGBs are traded on ASX.
- Yield to maturity (YTM) is a useful measure for comparing different AGBs.
- The range of AGBs and their different YTM's can be plotted on a yield curve.
- The market price of AGBs can change in response to interest rate expectations.
- Changing market prices will affect the YTM's of AGBs

This knowledge is essential when putting together an investment strategy for Exchange-traded AGBs.

AGBs can be bought and held to maturity as well as being actively traded.

Trading the yield curve

Investors use the pricing relationship between bonds and their view on future interest rates to actively manage their bond portfolio.

A change in the market's view on the likely direction of interest rates will cause a change in the price of short versus longer dated bonds.

Investors will seek to take a position in advance of the new market view, hoping to profit from the change in price relationships.

Being able to take advantage of these changes can be tricky as the market can move very quickly to price-in the anticipated changes.

Remember, there are many factors influencing the direction of interest rates. Investors contemplating bond trading will need to have a strong understanding of these factors and the bond market.

Summary

- The holder of an Exchange-traded AGB has beneficial ownership of an Australian Government Bond in the form of a CHESS Depository Interest (CDI).
- AGBs offer the following investment features;
 - secure, regular and stable income stream
 - reduced risk through diversification (when held as part of a portfolio of other financial products)
 - liquid investment
 - potential profit or loss in line with changes in the price of the AGB
 - hedge against inflation (for TIBs only).
- To achieve these outcomes you can expect to receive a lower level of return than from an investment that exposes you to a greater level of risk.
- The basic measure of return for an AGB is the 'coupon rate'. This is the income it pays expressed as a percentage of its face value.
- Yield to maturity (YTM) is a total return measure, which means it takes account of both capital gain (or loss) and income earned.
- There is a range of AGBs with different maturities and yields. You can use these two variables and plot the range of AGBs on a graph to create a 'yield curve'.
- AGB prices go up and down.
- The price buyers and sellers will be willing to accept is influenced principally by interest rate expectations - which in turn are affected by a range of economic considerations.
- Also relevant are
 - time to maturity, and
 - eligibility to receive the next coupon payment.