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Topic 1: Overview

There are two types of Australian Government Bonds traded on ASX via the CDI mechanism - Exchange-traded Treasury Indexed Bonds and Exchange-traded Treasury Bonds.

1. Exchange-traded Treasury Indexed Bonds (TIBs) are medium to long-term debt securities. Their face value is adjusted for movements in the Consumer Price Index (CPI). Interest is paid quarterly, at a fixed rate, on the adjusted face value. At maturity, investors receive the adjusted face value - the value adjusted for movement in the CPI over the life of the bond.

2. Exchange-traded Treasury Bonds (TBs) are medium to long-term debt securities. Their key difference from TIBs is their face value is fixed. The income amount that they pay is therefore fixed and is payable six monthly.

This module focuses on Exchange-traded Treasury Indexed Bonds. (While there are important differences between the two products, you will notice some similar material between Modules 3 and 4.)

Why invest in Exchange-traded Treasury Indexed Bonds?

Exchange-traded Treasury Indexed Bonds (TIBs) are one of the most secure investments available with a very low risk of not receiving your interest payment or the payment of face value due at maturity.

TIBs are hedged against the effects of inflation. The face value of a TIB is adjusted for movements in the Consumer Price Index (CPI). The effect is that inflation does not erode the value of your investment.

TIBs pay a regular income stream that changes in line with inflation.

TIBs can be readily bought and sold on market. This means your money is not locked into a fixed investment term as is the case with, say, term deposits.

The market price of TIBs is typically more stable than share prices.

Different issuer	✗
Traded on different markets	✗
Face value adjusts	✓
TIB investment locked in until maturity	✗

Investment needs	Investment feature
I want income	Regular interest payments
I want payment of face value at maturity	Credit standing
I don't want to be locked in	Traded on market
I am concerned about inflation	CPI adjusted

Differences between TIBs and TBs

Face value adjusts for inflation

The face value of a TIB is adjusted for inflation. This is in contrast to a TB, where the face value is fixed.

A TIB's face value is adjusted every quarter by the six month delayed Consumer Price Index (CPI).

The market price of the TIB can be expected to reflect this change in face value. At maturity you receive the adjusted face value. In the unlikely event of a period of sustained deflation, the face value returned at maturity cannot be less than \$100.

You can find out about the adjustment amount via the [Market Announcements Platform](#) on the ASX website. You can search for recent adjustment announcements by typing in the first three characters for a TIB's ASX code - 'GSI'.

Coupon rate is fixed but the dollar value of your income will change

During the life of a TIB, because its face value changes, the dollar value of the coupon payments also change.

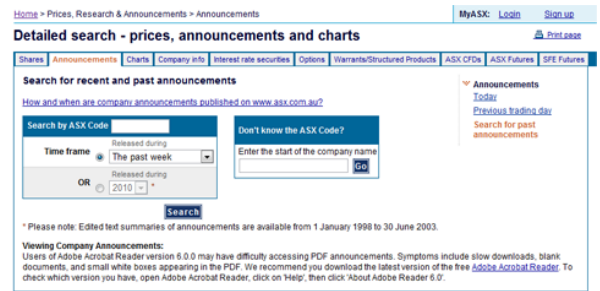
Whilst a TIB's coupon rate is fixed, each coupon payment is calculated on the adjusted face value. So you can expect to receive a higher coupon payment, if the face value of the TIB is adjusted upwards.

The coupon for a TIB is paid every three months (unlike TB coupons which are paid every six months).

Similarities between TIBs and TBs

In the same way the TBs replicate all the essential features of Treasury Bonds traded in the wholesale market, TIBs replicate all the essential features of Treasury Indexed Bonds traded in the wholesale market.

In order to facilitate trading by retail investors TIBs are settled using the CHES Depository Interest (CDI) mechanism, in the same way that TBs work.



Date	TB	TIB
March	\$2.25	\$1.17
June		\$1.17
September	\$2.25	\$1.19
December		\$1.19



You have a choice of coupon rates and maturity dates

The Australian Government issues different 'series' of Treasury Indexed Bonds. A series is characterised by a unique coupon rate, coupon payment dates and maturity date.

New series of Exchange-traded TIBs become available to trade on ASX as the Australian Government issues new series into the wholesale market.

You can expect fewer series of TIBs to be available than TBs.

ASX Code	Coupon	Maturity
GSIO15	4.00%	20-August-2015
GSIO20	4.00%	20-August-2020
GSIC22	1.25%	21-February-2022
GSIQ25	3.00%	20-September-2025
GSIQ30	2.50%	20-September-2030

Topic 2: Income and price

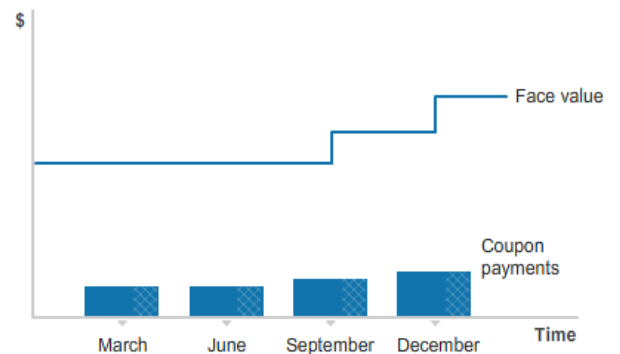
Coupon rate is fixed but your cash payment changes

The coupon rate for a TIB is fixed. This rate is expressed as a percentage of a TIB's face value.

Because the face value of a TIB is adjusted for inflation, the cash payment amount for a TIB may vary between coupon payments.

You do not know ahead of time a TIB's face value at maturity, because it will continue to be adjusted in line with movements in CPI.

Consequently you cannot precisely calculate the future coupon payments or the face value you will receive at maturity for a TIB.



Calculating a TIB's coupon payment

The calculation for immediately upcoming payments is straightforward when you know the adjusted face value.

For example, if a TIB has a coupon rate of 3% per annum and a CPI adjusted face value of \$105, your next payment ('coupon') would be \$0.7875. Calculations are made to 4 decimal places with the total payment per holder rounded to the nearest cent. Coupon payments for TIBs are made four times per year (quarterly). A TIB's quarterly coupon payment can be calculated using the formula:

$$\text{Coupon} = \text{aFV} \times R / 4$$

Where:

- aFV = the CPI adjusted face value
- R = the fixed coupon rate per annum

Because their face value and coupon payments reflect changes in the CPI, TIBs protect the value of your investment from declining due to the effect of inflation.

Adjusted face value	Coupon rate	Coupon
\$102	3%	\$0.765
\$120	2%	\$0.60

Market price of a TIB includes accrued interest

The market price of a TIB includes the interest that has accumulated since the last coupon payment. This means you can expect the price of a TIB to increase incrementally each day as a coupon payment approaches and then adjust downwards by the value of the coupon on the ex-interest date.

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

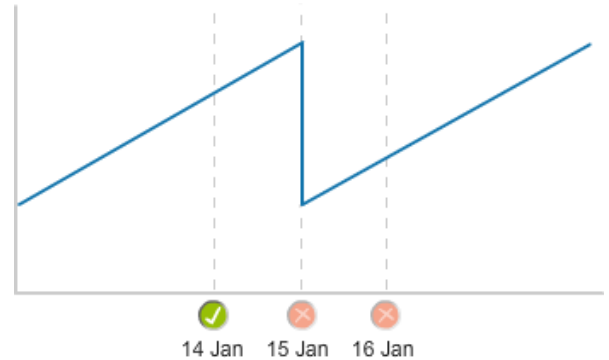
(Bond market professionals sometimes use the term the 'dirty price' to refer to the market price that includes accrued interest and the term 'clean price' for the price without the accrued interest.)

Pricing example of interest accruing

A TIB with a 4% coupon rate is due to pay a coupon on the adjusted face value of \$115. Interest accrues at the rate of approximately 1.26 cents per day over the quarter. The market price of the TIB incorporates this accrued interest.

The market price can be expected to increase as the ex-interest date approaches, and then to drop by the quarterly interest payment (\$1.15) on the ex-interest date.

This is an equivalent process to a share price falling on the ex-date for a dividend.



Topic 3: Realising your investment

Holding a TIB until maturity or selling beforehand

You can realise your investment in a TIB by holding it until maturity or selling it beforehand.

At maturity

If you hold a TIB until maturity, you will receive the CPI adjusted face value and the last coupon.

When a TIB's face value is paid out, it is called 'redemption'.

Before maturity

If you want to exit your investment before maturity, you will have to sell your TIB. The value you receive for your investment is determined by the price of the TIB in the market.

When you sell on market there is no guarantee you will receive either what you bought the TIB for or its face value.

Adjusting the TIB's face value

The face value for a TIB is adjusted every quarter by a 6 month delayed CPI amount.

Detailed information about the adjustment (known as the Kt factor) is contained in the Information Statement for Exchange-traded AGBs published by the Australian Government.

Adjustments are announced via the Market Announcements section of the ASX website (search under the underlying code for a TIB - 'GSI').

Why the face value for a TIB can be different to its market price

There are two factors that influence the difference between the face value and the market price of the TIB.

1. If market interest rates have changed since the time the TIB was issued, the TIB's price will probably have changed too.



As noted in Module 2, there is an inverse relationship between a TIB's interest rate and market price:

- as interest rates rise, prices fall, and
- as interest rates fall, prices rise.

2. Face value is adjusted in line with past changes in the CPI. Market price will include expectations of future CPI changes. This difference contributes to the difference in market price versus face value.

Capital gain/loss on redemption or sale

If you buy a TIB and hold until maturity, you may make a capital gain/loss depending on the difference between your purchase price and the adjusted face value you receive at maturity.

If you buy and sell a TIB on ASX, you may make a capital gain/loss depending on the difference between your purchase price and your sale price.

Any capital gain/loss you make on redemption or sale of your TIB should be taken into account when you consider your overall return from the TIB.

Your total return on a TIB includes:

- regular interest payments, and
- any capital gain/loss on redemption or sale.

Calculating your return

A TIB's yield to maturity (YTM) captures both the income you will earn and any expected capital gain or loss should you hold the TIB to maturity.

Using YTM enables you to compare TIBs with different coupons and different prices. (For more information on yield to maturity, see Module 2.)

When you calculate the YTM for a TIB the return may look quite low - if you add the current inflation rate to the TIB's yield, you will get a YTM that is a better comparison with that of a TB.

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

What happens to TIBs if deflation occurs?

The face value is adjusted downward, and your interest payments are less than they would be if inflation occurred, or if the CPI remained the same.

In the unlikely event of a period of sustained deflation, the face value returned at maturity cannot be less than \$100.

There is also a floor on coupons so that the value of the payment never falls below the coupon's initial value.

Topic 4: Example of TIBs trading at different prices

Looking at the range of TIBs on issue

The range of TIBs on issue will change as maturity dates are reached and new series are issued.

This topic's example will reference the table of TIBs on the right.

Why are TIB coupon rates lower than TB rates?

The coupon rate for a TIB and TB is set at the time of the issue. This is so that the bond is issued at par (\$100)*.

The additional inflation-protection component of a TIB is the reason why the coupon rate on a TIB is generally lower than on a TB.

Remember that your TIB's face value is automatically adjusted in line with the CPI.

In an inflationary environment, an investment in TIBs will ensure that your investment isn't eroded by inflation.

*The face value of a bond at issue date.

Different coupon rates & maturities = different prices

In our example table, each TIB has a different coupon and/or maturity date. A TIB with a higher coupon will trade at a higher price than a TIB with a similar maturity but lower coupon.

For example, the August 2020 TIB has a coupon of 4%.

The February 2022 TIB has a coupon of 1.25%.

Even though the maturity date of the two securities is relatively close, the difference in when the bonds were first issued (and thus the amount of CPI adjustment), and the coupon rate will mean that the price they trade at in the market is likely to be different, perhaps significantly so.

Coupon	Maturity
4%	20-August-2015
4%	20-August-2020
1.25%	21-February-2022
3%	20-September-2025
2.5%	20-September-2030

Coupon	Maturity
4%	20-August-2015
4%	20-August-2020
1.25%	21-February-2022
3%	20-September-2025
2.5%	20-September-2030

Different coupon rates & maturities = different prices

In our example the market price on 13 July 2012 for the August 2020 TIB was \$195.87, which included \$0.97 in accrued interest. The face value at this time was \$151.47.

At the same time, the market price for the February 2022 TIB was \$108.16, which included \$.0198 in accrued interest. The face value at the time was \$100.34.

What explains such a big difference in the market price, amount of accrued interest and face value?

Coupon	Maturity	Face value at time	Market price at time
4%	20-August-2015		
4%	20-August-2020	\$151.47	\$195.87
1.25%	21-February-2022	\$100.34	\$108.16
3%	20-September-2025		
2.5%	20-September-2030		

Looking at the August 2020 TIB first

If you purchased the August 2020 TIB on 13 July 2012, you would have received a coupon of \$1.5147 on the next coupon date being 20 August 2012.

Thereafter you would receive quarterly coupon payments of 4% per annum on the CPI adjusted face value

On maturity, you would receive the CPI adjusted face value and the final coupon of 4% p.a. (e.g. 1%) on this adjusted face value.

The yield to maturity on the trade date (13 July 2012) is calculated based on the purchase price and was 0.395%.

Since its issuance date, the face value has been steadily adjusted upwards - from \$100 to \$151.47 as at June 2012. The big difference between the market price and the face value is attributed to the attractive income stream the TIB offers.

Coupon	Maturity	Face value at time	Market price at time	YTM
4%	20-August-2015			
4%	20-August-2020	\$151.47	\$195.87	0.395%
1.25%	21-February-2022	\$100.34	\$108.16	
3%	20-September-2025			
2.5%	20-September-2030			

Looking at the February 2022 TIB

If you purchased the February 2022 TIB on 13 July 2012 you would have received a coupon of \$0.3125 on the next coupon date being 21 August 2012.

Thereafter you would receive quarterly coupon payments of 1.25% per annum on the CPI adjusted face value.

Coupon	Maturity	Face value at time	Market price at time	YTM
4%	20-August-2015			
4%	20-August-2020	\$151.47	\$195.87	0.395%
1.25%	21-February-2022	\$100.34	\$108.16	0.44%
3%	20-September-2025			
2.5%	20-September-2030			

At maturity, you would receive the CPI adjusted face value and the final coupon of 1.25% p.a. (e.g. 0.3125%) on this adjusted face value. The yield to maturity on the trade date (13 July 2012) was equivalent to 0.44%. This longer dated TIB has a slightly higher yield to maturity than the August 2020 TIB.

The significant difference in price can be explained by comparing different income streams from the two TIBs.

Even though the yield to maturity was quite similar between the two TIBs, the big difference in market price (\$87.71) reflects the larger income stream and face value you would earn from the August 2020 TIB relative to the February 2022 TIB.

Summary

- TIBs pay you a fixed rate of interest (the coupon rate) based on their CPI adjusted face value. Interest is paid four times a year in arrears.
- At maturity, you are paid the CPI adjusted face value.
- If you want to sell your TIBs before maturity, you can do so on market at the prevailing market price, which may be above or below the face value.
- A TIB's market price may be different from its face value. Consequently, you may make a capital gain or loss if you either buy or sell a TIB.
- Your total return from a TIB therefore includes:
 - regular interest payments, and
 - any capital gain/loss on redemption or sale.
- The main risks of TIBs are:
 - interest rates may move unfavourably, causing a fall in their market price and an increased potential for capital loss, and
 - deflation may reduce your coupon payment amounts.