Report on the cost of debt during the averaging period:

The impact of callable bonds

Prepared for the

Australian Energy Regulator

By Oakvale Capital

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Table of Contents

Glossary

Balloon payment……..A lump sum payment required on maturity of the bond.

Bank Bill Swap Rate (BBSW) ...Is a reference interest rate compiled daily by the Australian Financial Markets Association (AFMA) and used for the rate setting of interest rate swaps, floating rate notes and corporate loans.

Coupon .....The regular interest payments on a bond.

Coupon period.....The length of time between coupon payments on a bond. Usually, fixed rate bonds make coupon payments every six months, and floating rate bonds make coupon payments every three months.

Credit wrap……Where a specific line of debt is guaranteed by a bond insurer, in addition to the actual bond issuer.

Debt market practitioners .....A debt market trader, investor or active participant with a thorough knowledge and understanding of how the debt markets function and are priced.

In-the-money……..Where an option's strike price is below the current market price such that exercising the option creates a benefit to the purchaser of the option.

ITraxx Index……An index reflecting the credit default spreads of 25 equally weighted Australian financial institutions and corporates. See appendix D.

Out-of-the money……Where an option's strike price is above the current market price such that exercising the option does not create a benefit to the purchaser of the option.

Price discovery……The process whereby an investor uses all available resources to ascertain the current value of a security.

Pricing Model……Mathematical model used by market participants to price financial securities. Such models are based off inputs from observable market data to determine an appropriate asset price.

Rating Agencies .....Companies that evaluate the likelihood of default (credit rating) for a particular company or financial security.

Senior issue .....Debt that has priority in the event of default. Holders of senior debt are repaid before holders of subordinated debt and equity but after payment of deposit holders.

Spot price .....The market price for a particular financial security on a given day such that settlement is immediate (either that day or anywhere up to 3 days from then depending on market convention).

Strike price .....The price at which an option can be exercised.

Subordinated issue .....Debt that ranks lower in the order of payments than senior debt but ahead of equity. In the event of default, senior debt is repaid in full before subordinated debt holders receive payments. Since it is riskier than senior debt, it trades at a lower price (higher yield).

Terms of reference

The Australian Energy Regulator (AER) has requested Oakvale Capital Limited (Oakvale) complete an expert witness report to be tabled at the Australian Competition Tribunal (Tribunal). The report is written with particular reference to the report submitted to the Tribunal by Jemena Gas Networks NSW Ltd (JGN) prepared by the Competition Economists Group (CEG) titled *Estimating the 10 year BBB+ cost of debt: A report for JGN*, dated December 2010.

AER has requested a report that addresses the following questions with reference to report provided by CEG in December 2010 and the relevant averaging period, the period from 8 April 2010 to 6 May 2010 inclusive.

1. Describe, in general terms, how debt market practitioners:
    a. determine the price (yield) on; and
    b. assess overall value to an investor of,

    standard bonds (straight debt).
2. Describe, in general terms, how debt market practitioners:
    a. determine the price (yield) on; and
    b. assess overall value to an investor of,

    bonds with non-standard features, such as:

    I bonds with call options;

    II bonds with 'make whole' call options; and

    III bonds with contracts that specify a coupon reset on credit rating downgrade.
3. For each type of non-standard debt listed in question (2), describe the expected price (yield) relative to standard debt during:
    a. normal market conditions; and
    b. the relevant averaging period (if this differs from the response above).
4. Consider the callable bonds listed in the CEG report:
    a. provide a worked example of the calculation of the value of the call option on one of these bonds during the relevant averaging period; and
    b. estimate the price (yield) on these bonds across the relevant averaging period in the absence of call options.
5. Referring to the graphs appearing at Figure 8 and 12 of the CEG report (on pages 26 and 32):
    a. Briefly describe the general pattern of yields for callable bonds and non-callable bonds:

        i before accounting for the value of the call options; and

        ii after accounting for the value of call options as estimated in your answer to question (4)(b) above.

b. Briefly set out what are, in your view, the key reason(s) for the different relative yields of each of the callable bonds and each of the non callable bonds.

6. Specifically consider the bonds relating to the Dalrymple Bay Coal Terminal (previously issued by Babcock and Brown Infrastructure, now Prime Infrastructure) with particular reference to the 2021 DBCT bond:
    a. identify all relevant features that would be considered by a debt market practitioner when determining the price (yield) of these bonds;
    b. provide your opinion of why these bonds were valued at their particular prices during the relevant averaging period; and
    c. estimate the price (yield) on these bonds across the relevant averaging period in the absence of 'make whole' call options.
7. Specifically consider the bond issued by SPI Electricity and Gas:
    a. identify all relevant features that would be considered by a debt market practitioner when determining the price (yield) of this bond;
    b. provide your opinion of why this bond was valued at this particular price during the relevant averaging period; and
    c. estimate the price (yield) on this bond across the relevant averaging period in the absence of the 'coupon reset on rating downgrade' characteristic.
8. Comment on the interpretation of data from financial data providers (such as Bloomberg, CBA Spectrum and UBS) with specific regard to:
    a. conventions for yield reporting; and
    b. conversion of fixed to floating.

This report addresses these 8 questions in turn.

Federal Court Guidelines on Expert Witnesses

I have read and considered the Federal Court Guidelines on Expert Witnesses. I have made all inquiries I believe are desirable and appropriate to answer the questions put to me. No matters of significance that I regard as relevant have to my knowledge been withheld.

Paul Llewellyn Garnet Travers

4 February 2011

Qualifications and Experience of Mr. Paul Travers

I am currently an Executive Director of Oakvale Capital Limited (***Oakvale***). I have held this position since June 2009. Prior to my current role, I was employed by Oakvale as its Chief Operating Officer (***COO***), a position I held from January 2004 to June 2009.

Prior to commencing employment with Oakvale in January 2004, I was a Director in Ernst & Young's Financial Risk Management Group. Prior to that I was employed in the Financial Commodity Risk division of Anderson Consulting. I have also previously worked in the derivatives distribution groups of Bank of America and Security Pacific Limited.

I have a Masters in Commerce (major in finance) from the University of New South Wales, Sydney and a Bachelor of Arts in Economics from Claremont McKenna College in Los Angeles, California.

I have been a Senior Fellow of the Securities Institute of Australia / Finsia since 1997, where I have lectured in derivative products, as well as being a member of its:

(a) Financial Risk Management Course Task Force from 1997 to 2005;

(b) Anti Money Laundering Working Group from 2004 to 2005; and

(c) Financial Markets Advisory Group since 2008.

Since about 1996, I have been a member of the Finance and Treasury Association, of which I became a board member in 2009 and a Fellow in 2010. I have also been the Chair of its NSW Technical Committee since 2008.

Activities of Oakvale Capital Limited

For more than 20 years, Oakvale Capital has been providing organisations with professional financial risk management advice to a diverse range of corporate and government institutions. Oakvale is one of the largest independent financial risk management organisations in Australia with over 180 clients managing foreign exchange, interest rate and commodity exposures, Oakvale has built a strong reputation as one of Australia's leading providers of financial risk management advice and outsourced treasury services.

Oakvale's services cover most aspects of a treasury function allowing clients to manage their treasury risks with knowledge, supported by independent advice, and mitigates operational risk. These services are provided by seasoned market professionals whose market experience is measured in decades not years.

Oakvale's clients come from a broad range of industries, including local councils and state government agencies, mining companies, health funds, utilities, ASX listed corporations and privately owned corporations. Within the 180 strong client base Oakvale manages over AUD 100 billion of foreign exchange, interest rate and commodity risk exposures and has approximately AUD $3 billion in surplus funds under advisory management.

Oakvale commenced providing treasury services in 1988, by 1993 Oakvale had 30 clients, and has continued to steadily grow those numbers since then.

Oakvale's client base is loyal and they tend to remain with Oakvale for extend periods of time, in fact a large number of the original 30 clients remain clients today.

Executive summary

This report responds to specific questions raised in relation to how the market views prices of bonds, and in particular examines the impact of extra features added to bonds—such as make whole provisions, call features and step up / step down coupons.

The price/yield attributed to any bond by the market is driven by many factors and the final price/yield which an investor will pay/receive for any bond indicates the overall perceived value of the bond to that particular investor at that particular time.

For an investor to put a price they are willing to pay for a bond they must first ensure, amongst other things, that the bond meets their investment and risk criteria. This selection criterion can be described as forming part of the qualitative approach which investors apply when reviewing potential investments. Once an investor determines that a bond could be considered for their investment portfolio, they will determine whether they are willing to buy the bond and at what price by analyzing a number of key variables that are important and perhaps specific to them. If the conclusion is to invest then this is when the investor will apply the quantitative analysis to determine final payment. The inputs used to populate the pricing model, which determines the price/yield, will be a combination of readily observable features such as the coupon rate and maturity of the bond.

The impact of specific option features which can be included in a bond are also reviewed in this report, specifically call options, make whole options, and coupon resets upon downgrading clauses. After reviewing the impact on bond yields containing these features, the conclusion reached is that while the inclusion of some option features has an impact on the price of a bond, other variables such as, but not limited to, industry sector, market sentiment, economic outlook, credit rating and secondary market liquidity more heavily influence the price/yield that an investor is willing to pay.

Option features are important as they are often sought by investors for their perception of increased security and liquidity, especially for longer dated issues. From an issuer perspective, these features often allow them to reach a wider investor base. However, reviewing the figures provided in the CEG report, specifically Figure 8 and 12 on pages 26 and 32 respectively, it does appear that the industry background of the issuer plays a greater role in determining its yield position relative to other bonds with similar ratings in contrast to the call features imbedded in a number of the bonds reviewed.

General bond pricing methodology

Terms of reference:

1. Describe, in general terms, how debt market practitioners
    a. determine the price (yield on); and
    b. assess overall value to an investor of,

standard bonds (straight debt).

1. For the debt practitioner to determine the price (yield) on standard bonds there is a combination of both qualitative and quantitative analysis. The qualitative analysis typically comes first and involves assessing the key variables that are important to the investor which will be used to develop a view on the current market conditions and the relative value of the bond to the investor. If the conclusion is to invest then this is when the investor will apply the quantitative analysis to determine final payment. The inputs used to populate the pricing model, which determines the price/yield, will be a combination of readily observable features such as the coupon rate and maturity of the bond.

The Qualitative Analysis

2. The formulae at Diagrams 1, 2 & 3 in paragraphs 6, 9, and 11 respectively are useful in pricing and valuing bonds in isolation but they fail to take into account key market-based variables that cannot be readily quantified. The qualitative analysis or put more colloquially the "gut feel" of any market practitioner varies from participant to participant but some of the major variables to be assessed when looking at the price (yield) of a standard bond are;

3. Credit Aspects

- Term to maturity – bonds with longer maturities will normally require a higher return; longer term bonds may be beyond an investor's portfolio mandate for their investments. For example, most investor groups are limited by mandates that prohibit investments beyond three or five years. Here, 'investor groups' includes (but is not limited to) financial institutions, corporate clients, retail investors, superannuation funds, charities, hedge funds, fixed income investment funds, and insurance companies.
- If a company issued ten year bonds, large parts of the potential investor pool would be unable to buy the debt, regardless of the risk metrics involved. Therefore, a company looking to issue longer term bonds would need to offer these bonds at a premium to a) attract the reduced pool of investors and b) compensate investors for the resulting lack of secondary market liquidity in the bond issue.
- Credit rating – all things being equal, the more highly rated a bond the lower the yield should be. A key point of differentiation is whether a bond is investment grade or not, i.e. is the rating above BBB, as a vast majority of investment mandates preclude investments with sub investment grade ratings. Investors often have a ratings profile that must be maintained within their portfolio mandate for investing. A review of the current credit rating and available credit reports from Rating Agencies would be considered.
- Credit margin – is the credit margin in line with current trading activity or future expectations for the issuer by the buyer?

- Issue size – is the issue large enough to support secondary market activity?
- Credit wrap feature – does the bond have any credit wrap features, what is the strength of the name of the institution providing the credit wrap and what level of support the credit wrap actually provides the bond?
- Pricing comparison to peers – how is the issue priced compared to other similarly rated issuers and those within its peer group (industry)? For example, infrastructure bonds don't have a high number of issuing peers and therefore it is more difficult to conduct a comparison against a peer group. Infrastructure bonds are often issued well past the preferred maturity date of most investor's mandates and there is a significant element of price discovery required. Secondary market activity is low and the supporting hedging markets are illiquid making risk management activities, particularly beyond 10 years, more difficult thus supporting a desire for wider pricing (i.e. higher yields).

4. Liquidity Aspects

- Market sentiment – does the market momentum / economic outlook support investment at the current point in time, and what are expectations going forward? In particular, debt market practitioners would consider the economic prospects and the outlook for interest rates.
- Scarcity (availability) and desirability of issuer – is the issuer constantly issuing, is there over/under supply on the market at the moment, will there be significant issuance in the future? Liquidity of bond issues is important in determining pricing. For example, banks issue senior bonds regularly; these tend to be highly rated issues with a maximum maturity length of five years. Therefore senior bank issues have maximum liquidity as they can appeal to the widest possible investor base and have maximum transferability. Price discovery is reduced as each bond issue has several peers it can be compared against – ensuring accurate and transparent pricing.
- Industry prospects – what is the outlook for the industry that the issuer normally operates in?
- Financial standing of company – how is the financial standing of the company and what are its prospects?
- Abnormal features – does the bond contain any abnormal features or one off terms that may impact secondary market liquidity?

Liquidity is not readily available in the Australian corporate bond market, in contrast to the Australian commonwealth and semi government bond markets. This creates an ongoing challenge for issuers as even though they can raise funds in this market it is not readily available and therefore cannot be relied upon as a ready source of capital.

The Quantitative Analysis

5. The method used by debt market practitioners to determine straight debt pricing is dependent on whether that debt is floating or fixed in nature:

Fixed Rate Debt

6. The most basic form of fixed rate debt valuation is the *net present value* (NPV) approach. Using this method, the value of the future balloon payment and all known future cash flows are discounted back to today, using a relevant interest rate and the regularity of cash flows over the expected life of the bond. The relevant interest rate used for discounting can either be:

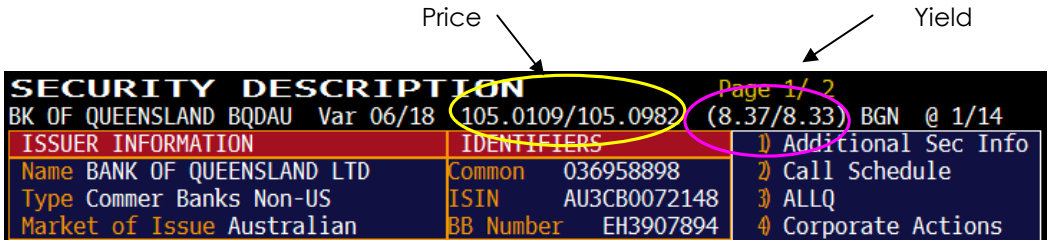
   a) A required yield of the bond, that is, the expected return given the market price paid for the bond.
   b) A market interest rate. For example, using NPV to value a Government bond would require future cash flows to be discounted using a Government bond curve. On a corporate bond however, future cash flows would be discounted using a swap curve approximately equal to the credit rating of the issuer.

Diagram #1 – NPV bond valuation formula (details shown in Appendix A[1]):

$$P = C\left(\frac{1-(1+i)^{-N}}{i}\right) + M(1+i)^{-N}$$

7. Market practice is to quote bond prices as a yield to maturity - that is, the anticipated rate of return if the bond is held to maturity, given the price paid for the bond rather than an "all up" dollar price. These yields are obtained from market sources such as Reuters[2], Bloomberg[3] and Yieldbroker[4], or from market makers or brokers who collate quoted and traded prices on securities from contributing fixed income price makers.

8. An example of a bond quote from Bloomberg is shown below showing a price quote and a yield quote.



9. The NPV approach cannot be readily used by market practitioners as pricing is often required between coupon periods. As such, a more complex bond formula is required to account for partial coupons using the readily available market quoted yields. For straight debt, the market uses the *International Security Markets Association (ISMA) bond formula* which has the following assumptions:

   a) Fixed coupon payments that do not vary as a function of the actual dates between payments (with the possible exception of the first and last payments);

[1] The Handbook of Fixed Income Securities, seventh ed., Frank J. Fabozzi (ed), McGraw-Hill, 2005, p. 75.
[2] www.reuters.com
[3] www.bloomberg.com
[4] www.yieldbroker.com

b) No allowance for the precise timing of the cash flows. That is, bonds are conventionally priced by assuming that each coupon payment falls on the nominal payment date with no adjustment for holidays or weekends;
c) A single redemption date and a fixed redemption value (bullet bonds); and
d) No call or put provisions.

Diagram #2 – Bond formula from ISMA (details shown in Appendix B[5]):

$$P = v^{\frac{r_1}{s}}\left\{d_1 + d_2 \times v + \frac{c}{h} \times \frac{v^2\left(1-v^{n-1}\right)}{(1-v)} + \left[100 + cpn^*\right] \times v^{n+\frac{r_2}{s}}\right\}$$

Floating rate debt:

10. Floating rate notes (FRNs) have a periodic coupon which pays a fixed margin above (or below) a benchmark interest rate. In Australia, this is usually the Bank Bill Swap Rate (BBSW). Pricing of FRNs by fixed income price makers is usually quoted in the form of a trading margin – that is, the market margin given the price of the FRN.

11. Pricing of FRNs is calculated using the formula at Diagram #3. This is a combination of the next known coupon payment to be paid and an annuity equal to the difference between the coupon margin and the trading margin paid through to maturity discounted back to today. These two components are then present valued from the next coupon date to the settlement date.

Diagram #3 – FRN pricing formula (details shown in Appendix C[6]):

$$P = \frac{\left[c^*(b + IM)^* \frac{d}{365} + \left[\frac{IM - TM}{t}\right]^* a_n + 1\right]^* 100}{1 + \frac{(r + TM)^* f}{365}}$$

12. In summary, the debt market practitioner would weigh up much of the qualitative analysis as described in paragraphs 3 and 4 in order to determine if the pricing represents overall value. In addition, does it feel right when compared to other investment alternatives and whether market momentum and indicators support investment at that particular point in time.

[5] http://help.derivativepricing.com/1282.htm
[6] http://www.afma.com.au/afmawr/_assets/main/lib90031/debt%20capital%20market%20conventions.pdf

Impact of Call Features

Terms of reference:

2. Describe, in general terms, how debt market practitioners:

   a) determine the price (yield) on; and

   b) assess overall value to an investor of,

   bonds with non-standard features, such as:

   i bonds with call options;

   ii bonds with 'make whole' call options; and

   iii bonds with contracts that specify a coupon reset on credit rating downgrade.

15. A call option is the right (but not the obligation) to buy/sell a particular asset at a particular point in time. The call feature in a callable bond can be European in nature (it has one call date), American (callable at any time until maturity) or Bermudan (callable on several dates). Market practitioners typically use option pricing models which are based on the Black-Scholes-Merton (BSM) model. Regardless of which model is used, the main drivers of option valuation are listed below:

    - Spot price – the closer the spot price is to the strike rate, the more likely it will be exercised;
    - Strike price – the lower the strike price, the more likely it will be exercised;
    - Interest rates – the current continuously compounded risk free rate;
    - Time to expiry – the greater the time to maturity, the more likely an out-of-the-money option will become in-the-money before maturity; and
    - Volatility – the greater the spot price volatility, the more likely an option will move from out-of-the-money to in-the-money and vice versa.

16. A bond with a call option is of benefit to the bond issuer as it allows them to pay down more expensive bond debt when the market allows more favorably priced debt to be issued. If a callable bond is of benefit to the issuer, it therefore must be a negative to the bond holder – as a result, bond holders would generally require a higher return for holding a bond with a call feature. This higher return takes the form of a lower bond price and a higher yield as compared to identical straight debt. Therefore the price of a callable bond can be described accordingly.

    Market prices to the first call date

    - *Price of callable bond = price of straight debt – price of call option*

    or put alternatively

    - *Yield of callable bond = yield on the straight bond + yield of call option*

17. In order to avoid confusion the relationship between price and yield when discussing bonds should be clarified. If the price of a bond moves up, its quoted yield moves down and vice versa. For example, a bond is said to be priced at par when the fixed coupon rate and the yield are equal. A par bond at a price of 100 with a coupon rate of 8% will trade at a yield of 8%. If its price were to increase to 110, the coupon rate remains at 8%, however the yield would fall to 8/110 = 7.27%. The quoted yield in this respect is the overall return an investor would receive on the bond if it were held to maturity.

18. The price of the callable bond is linked to the probability of the call feature being exercised by the bond issuer. For example, if market interest rates have increased since the bond was issued, the price of the call option feature will be minimal as the bond issuer is unlikely to exercise the call as refinancing would be done at a higher interest rate. In this instance, the callable bond should trade closely to comparable straight debt. If market interest rates have fallen since the bond was issued, the bond issuer has the opportunity to repay the bond proceeds and refinance at a lower interest rate. In this situation, the call option feature becomes relevant.

19. The quantitative analysis for bonds with call options utilises bond option pricing models. For example, the Hull White Factor 1 Model, described in Appendix I has been used for this paper. The value of the embedded option is calculated for the bond (as demonstrated in Question 4) and the debt market practitioner will then use this output to determine, using both qualitative analysis, as described in paragraphs 3 and 4, and the quantitative analysis, whether the bond represents overall value.

20. A 'make whole' callable bond is one that compensates the bond holder in the event their bonds are repaid early. The early repayment option could arise due to a number of events, including (but not limited to) such things as default, takeover or the bonds being called. This is done in the form of discounting the expected future cash flows back to the call date using the NPV method. This is a benefit to bond holders, as they are compensated or 'made whole' by receiving their expected future cash flows even though the bond is repaid prior to maturity. Provided that the interest rate used to discount the expected future cash flows is the same as the one used to value the bond, then a bond with a make whole call option should trade identically to straight debt as the make whole call feature makes a bond holder indifferent between holding the bond to maturity and accepting the proceeds of the call, all else being equal.

21. As in question 1, the debt market practitioner will use a combination of both qualitative and quantitative analysis to determine whether the bond represents overall value to him as an investor.

22. In practice, there is no generally market accepted pricing model to determine the value of a make whole call option, however, once the make whole call option is exercised the value of the bond, for payout purposes, is determined by using the formula as contained in Diagram 1 and expanded upon in Appendix A.

23. Along with the qualitative analysis variables as described in paragraphs 3 and 4, the debt market practitioner needs to look at the following advantages and disadvantages of a make whole call option to the bond purchaser when assessing overall value:

Advantages[7]

i. As an investor, if the make whole call is invoked, compensation is usually by an amount that is significantly above the debt's current fair value;
ii. There may be tax advantages if the bond is repaid early under the provision;
iii. The make whole call provides a level of comfort to the investor; and
iv. The price of the bond is unlikely to fall below the make whole call option price.

Disadvantages[8]

i. As the cost to the issuer can be significant, such provisions are rarely invoked so the debt market practitioner must weigh up if there is any real value to having the make whole option feature;
ii. The provision can be used at any time; and
iii. If invoked, the bondholder is subject to receiving a lump sum payment earlier than anticipated.

24. The debt market practitioner will, after assessing advantages / disadvantages plus the qualitative analysis as previously described, determine whether the bond represents overall value.

25. A coupon 'step up' feature in the event of downgrade is of benefit to bond holders when compared to straight debt. Therefore when compared to otherwise identical straight debt, bond holders should be willing to pay a higher price for a bond with this feature as they are compensated should the credit rating of the issuer be downgraded (paragraph 27 explores this further). This higher price results in a lower yield.

26. Below is an example of a table outlining the step coupon for a bond on downgrade. The degree to which a bond holder would be willing to pay more for a step up coupon on this debt as compared to straight debt, is dependent on:

- their assessment of the probability of the bond being downgraded during its lifetime. For example, if an investor purchased an AAA rated Australian Government bond, they would reasonably expect that the risk of downgrade was minimal. Therefore they would be less likely to see the benefit of the step up coupon and would value it less and the debt should trade similarly to otherwise identical straight debt. General market perception is that a lower rated bond (BBB) is more likely than a higher rated bond (AAA) to be downgraded (though the likelihood is still very small). Therefore, an investor who purchased a BBB rated corporate bond would be more likely to see the benefit of the step up coupon. They would place greater value on this feature as a result. Therefore lower rated step up bonds should trade at a higher price (lower yield), when compared to otherwise identical straight debt.

- any other covenants that surround the step up feature which would stop the step up coupon being applied in case of a downgrade, e.g. a change of control must accompany any downgrade.

- the size of the step up margin relative to the market pricing for a similarly rated debt instrument, e.g. if the step up margin is only 25bps yet the market implies that the step up margin should in fact be 50 bps then the market will not pay as much for the step

[7] http://www.capitaladvisors.com/about_capital_advisors_group/downloads/whitepapers/Make-Whole_Call_Provisions.pdf
[8] See 7.

up feature, i.e. seek an extra 25 basis points in yield in contrast to normal pricing for this bond.

7.50% plus a rating step up or step down margin in accordance with the following table:

Rating (or equivalent)	Applicable percentage adjustment per Rating Agency ("Adjustment")
Baa2/BBB	0.25
Baa3/BBB-	0.50
Ba1/BB+ (or lower)	1.00

27. In practice the step up coupon option is not priced. The debt market practitioner will weigh up the three points noted in paragraph 26, along with other qualitative variables, to determine whether the bond represents overall value to the bond purchaser. If so pricing is then based on the formula as described in Appendix A.

28. Additionally, the appearance of this step up coupon feature on a bond would indicate that the bond may have required this extra feature in order to attract investors, therefore the absence of this feature would result in investors requiring a higher yield (assuming investors would be willing to invest in the bond without this feature). Based on our experience this extra margin is often at least the value of the first step up, in this instance, 25 basis points.

Expected yields on non-standard debt

Terms of reference:

3. For each type of non-standard debt listed in question (2), describe the expected price (yield) relative to standard debt during:
    a. normal market conditions; and
    b. the relevant averaging period (if this differs from the response above).

29. In normal market conditions:

- Bonds with call options should trade at a price discount (higher yield) when compared to otherwise identical straight debt during normal market conditions. This is because a callable option is a negative to the bond holder, who may see their bond repaid before maturity – hence potentially losing out on future cash flows. Therefore bond investors would demand a higher rate of return for holding such bonds.
- Make whole callable bonds should trade equally to otherwise identical straight debt during normal market conditions. This is because when a make whole bond gets called by the issuer, the holder receives discounted future cash flows as compensation for the call. If a bond holder received discounted future cash flows today, he should be indifferent between receiving the proceeds from the bond call today and holding the bond to maturity.
- Bonds with a coupon step up in the event of credit rating downgrade should trade at a price premium (lower yield) when compared to otherwise identical straight debt. This is because the bond holder gets compensated with increased coupon cash flow from the step up margin in the event of downgrade. This is a benefit that a bond holder would be willing to pay for, compared to otherwise identical straight debt.

30. To determine if the relevant averaging period (8/4/10 – 6/5/10) can be classified as normal market conditions, Oakvale Capital has selected the following broad market indicators for illustrative purposes.

- Credit markets – iTraxx Australia 5year index
- Interest rate markets – 2, 5 and 10 year AUD interest rate swaps
- Currency markets - Australian dollar against USD

31. These three market indicators have been selected as they broadly reflect market movements and market sentiment. The list of indices which could have been selected is endless but broadening the approach is not likely to change the view on market conditions over the averaging period.

iTraxx Australia Index

32. This index was chosen as it broadly reflects market sentiment and conditions in the Australian credit markets and by default the Australian Fixed Income market. The higher the level of the iTraxx index the more negative is market sentiment and by implication higher credit spreads and therefore higher yields.

33. For example, suppose the index was trading at 100 today and in 1 months time it was trading at 120. The iTraxx index would be indicating that credit market sentiment was negative and yields would be higher (prices lower) at the end of the one month period than at the start of the period, given no change in the underlying interest rates. The opposite can be stated if the iTraxx declined from 100 to 80 over a similar period.

34. A description of this index is contained in Appendix D[9].

Interest Rate Swaps

35. The 2, 5 and 10 year interest rate swaps are highlighted as they show the trend and volatility before, during and after the relevant averaging period for longer term interest rates. Analysing trends and volatility is critical when deciding on whether to buy a fixed income security.

36. The level of interest rates will dictate the pricing and yields of existing bonds in the market place and also the level at which new bonds can be issued into the market place.

37. Using a fixed rate bond for example, if it was issued with a 6% fixed rate coupon for 5 years and the 5 year swap continues to move upwards towards say 6.50% then the price of the newly issued bond would decline reflecting a higher yield in line with the current market. In addition, if new bonds were being issued they would need to be issued with a higher coupon reflecting current market conditions.

AUD/USD Currency

38. This currency pair is used as a proxy for market sentiment as the AUD is highly correlated to commodity prices which in turn is a reflection of Australian economic prospects and financial conditions. In addition, a strong AUD often reflects the higher interest rates being paid in Australia relative to the rest of the world.

39. If the AUD was rising dramatically it would be an indicator that investors were buying AUD at the expense of USD for two reasons. Investors are seeing short term capital gains but more importantly they might be seeing the prospect of higher interest rates in Australia and investing looking for higher returns.

40. Australia is considered in world markets as a high yield currency and there are often trading positions instigated to take advantage of this. Therefore an appreciating AUD is often an indicator of higher rates and therefore by implication higher yields.

[9] http://www.markit.com/assets/en/docs/products/data/indices/credit-index-annexes/iTraxx%20Australia%20S11%20Rulebook%206May09.pdf

41. It should be noted at this point that there is great difficulty in determining exactly what is a normal trading period given the exaggerated trading conditions prior to the GFC[10], during the GFC and the trading period following the GFC; This can best be seen from the long term graphs in Appendix E, all which cover the period 20/9/2007 to 31/12/2010 and include more closer analysis for the averaging period.

42. The broad conclusion to make on reviewing the data on credit markets, interest rate markets and currency markets, which is presented in Appendix E, is that markets in themselves did not experience conditions over the averaging period that were overly exceptional one way or the other. The market did experience some volatility during the averaging period, however, this volatility was not enough to conclude conclusively that the conditions were not normal and therefore, in general i.e. putting aside anything which would specifically impact a specific bond, bonds with call options would have behaved in the manner described in paragraph 29.

[10] Global Financial Crisis

Calculated yields for callable bonds

Terms of reference:

4. Consider the callable bonds listed in the CEG report:
    a. Provide a worked example of the calculation of the value of the call option on one of these bonds during the relevant averaging period; and
    b. Estimate the price (yield) on these bonds across the relevant averaging period in the absence of call options.

43. The value of a call option in a bond is a function of what return the investor will not receive (or the issuer pay) should the call be exercised. There are two primary sources of return which are extinguished when a call option is exercised; credit return and/or interest rate return above current market levels. In the CEG report, Appendix E[11], none of the callable bonds referred to have an ongoing fixed coupon, they all are or become on the call date, floating rate notes. Hence the value lost to investors through the exercising of the call options will be any additional credit spread in the bond which is above the current market levels for this organisation (given the level of security available through the bond).

44. We have examined the value of the Bank of Queensland's subordinated bond issuance; reference AU3CB0072148, as a worked example to illustrate this value. Other than tribunal members' possible familiarity with the name Bank of Queensland there is no specific reason as to why the Bank of Queensland bond was selected over any of the other bonds that showed value in the embedded option.

45. We have used Bloomberg option modeling to calculate the value of the call option in the bond AU3CB0072148. Bloomberg, for pricing callable bond deals, uses a Hull-White 1 factor model which is a one factor, normal, short rate interest model. The Hull White Factor 1 Model is described in more detail in Appendix I.

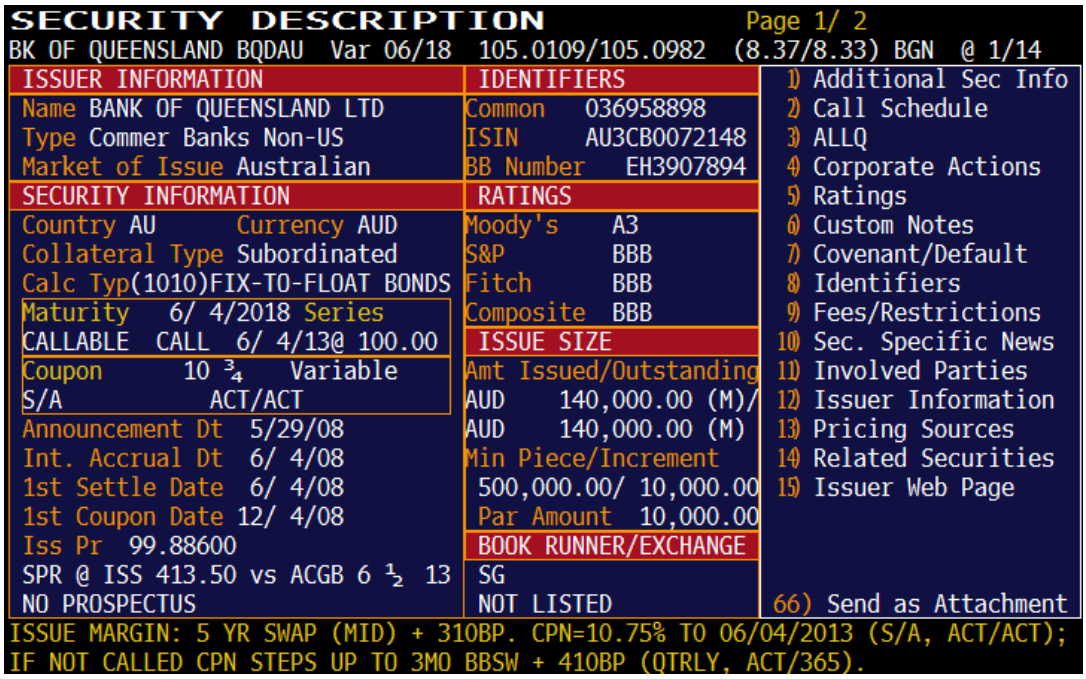
46. We have also used the abovementioned modeling capability in Bloomberg to remove the callable bond option and recalculate the price and yield. Screen shots of the Bloomberg analytics are contained in Appendix J.

47. From the CEG report it is noted that no analytics were used to calculate the value or otherwise of options.

48. We have selected this model as it enables us to obtain the price of the options embedded in a callable structure via Bloomberg's pricing model. Bloomberg, is used by Oakvale and is widely used in the marketplace by financial market participants for valuation and pricing on a large number of debt, derivative, foreign exchange and commodity instruments. This ensures Oakvale uses prices based on pricing models which are widely accepted and used by debt market participants.

[11] CEG, Estimating the 10 year BBB+ cost of debt, A report for JGN, Tom Hird (PhD) December 2010

Bond Description



Bond Call Schedule

49. This bond, issued by Bank of Queensland, has a call option. The bond is currently paying a fixed rate, however, will convert to paying a floating rate should the call not be exercised. The value of the call option is linked to the underlying credit margin and not the prevailing fixed interest rates. Should the bond not be called the bond will attract a coupon of BBSW plus 410 basis points. The bond was issued at a margin of 310 basis points and is currently trading at a margin of approximately 300 basis points. The difference between the price with and without the call option is a function of the net present value of the additional margin adjusted for the volatility (i.e. the possibility the

credit spread will change). The table below shows the Yield to maturity of the bond with and without the call option. The difference between the two yields over this time period was between 57 and 59 basis points.

Pricing Analytics AU3CB0072148 – with embedded option

Date	Yield to Call (%)	Yield to maturity (%)	OAS to call	Option Premium	Clean Price	Dirty Price
8th April 2010	8.6717	9.7804	299.1	-3.2151	106.11821	109.81
22nd April 2010	8.7973	9.8747	299.1	-3.2042	105.7202	109.83
6th May 2010	8.4674	9.5412	299.1	-3.2027	106.53745	111.06

Pricing Analytics AU3CB0072148- without option

Date	Yield to Call (%)	Yield to maturity (%)	OAS to call	Option Premium	Clean Price	Dirty Price
8th April 2010	N/A	9.2083	299.1	Nil	109.34328	113.03
22nd April 2010	N/A	9.2992	299.1	Nil	108.93556	113.03
6th May 2010	N/A	8.9727	299.1	Nil	109.75297	114.26

Difference in Yield to maturity when the option in removed

Date	Difference in Yield to maturity (%)
8th April 2010	- 0.572
22nd April 2010	- 0.576
6th May 2010	- 0.569

50. All bonds on pages 73-77 of the CEG report[12] with embedded options were analysed using the Hull White Factor 1 Model on Bloomberg. A list of all bonds examined is contained in Appendix F. Those bonds where the option had value have been analysed with the value of the embedded option excluded. Even though the prices are shown in Bloomberg may not reflect current market levels (as described in the CEG report) the comparison calculation illustrates the impact of the call options. The bonds impacted are listed below;

[12] Appendix E, CEG report

		Analysis with Option			Analysis with Without Option			
SNS Bank Nederland		Callable bond with increase in margin						
AU3FN0000618	Fixed equivalent yield							Change
Date	Call date (8/11/11)	Final maturity (8/11/16)	Option Premium	Clean Price	Final maturity (8/11/16)	Option Premium	Clean Price	in Yield
8/04/2010	5.285	6.6788	-3.2503	100.63	6.0613	0	103.88	0.618
22/04/2010	5.3058	6.7775	-3.2703	100.62	6.1508	0	103.89	0.627
6/05/2010	5.2845	6.4405	-3.2701	100.61	5.8175	0	102.73	0.623
AMP Group Finance		Staight Call						
AU0000AQNHA5	Fixed equivalent yield							Change
Date	Call date (15/5/14)	Final maturity (1/4/19)	Option Premium	Clean Price	Final maturity (1/4/19)	Option Premium	Clean Price	in Yield
8/04/2010	7.8456	10.5012	-14.7483	110.68744	8.426	0	124.15683	2.075
22/04/2010	7.978	10.5966	-14.7166	110.93898	8.5587	0	124.03243	2.038
6/05/2010	7.6426	10.2918	-15.0278	111.20862	8.274	0	124.26892	2.018
Vero Insurance (Suncorp)		Callable with increased margin						
AU300VER0021	Fixed equivalent yield							Change
Date	Call date (7/9/15)	Final maturity (7/9/25)	Option Premium	Clean Price	Final maturity (7/9/25)	Option Premium	Clean Price	in Yield
8/04/2010	5.9393	6.6904	-3.6152	102.88696	6.3208	0	106.50227	0.370
22/04/2010	6.0498	6.7718	-3.7039	102.88578	6.3905	0	106.59012	0.381
6/05/2010	5.6926	6.442	-3.774	102.83027	6.0613	0	106.60401	0.381
Swiss Re		Fixed to Call date, then floating with margin						
AU3CB0024743	Fixed equivalent yield							Change
Date	Call date (25/05/17)	Final maturity (29/12/49)	Option Premium	Clean Price	Final maturity (29/12/49)	Option Premium	Clean Price	in Yield
8/04/2010	11.6905	8.2944	-3.7905	82.0735	8.1214	0	83.54971	0.173
22/04/2010	11.9404	8.3663	-4.4496	81.15	8.1362	0	83.08	0.230
6/05/2010	11.9385	8.1034	-5.7052	81.22	7.7866	0	83.9564	0.317
Bank of Queensland		Fixed to Call date, then floating with margin						
AU3CB0072148	Fixed equivalent yield							Change
Date	Call date (4/6/13)	Final maturity (4/6/18)	Option Premium	Clean Price	Final maturity (4/6/18)	Option Premium	Clean Price	in Yield
8/04/2010	8.6717	9.7804	-3.2151	106.11821	9.2083	0	109.343277	0.572
22/04/2010	8.7973	9.8747	-3.2042	105.7202	9.2992	0	108.93556	0.576
6/05/2010	8.4674	9.5412	-3.2027	106.53745	8.9727	0	109.75297	0.569
Bank of Queensland		Floating Callable with increase margin						
AU3FN0005914	Fixed equivalent yield							Change
Date	Call date (4/6/13)	Final maturity (4/6/18)	Option Premium	Clean Price	Final maturity (4/6/18)	Option Premium	Clean Price	in Yield
8/04/2010	8.5758	9.7591	-3.5066	100.60958	9.1253	0	104.11621	0.634
22/04/2010	8.7021	9.8515	-3.4951	100.62922	9.2149	0	104.12434	0.637
6/05/2010	8.3666	9.5198	-3.4996	100.616241	8.8878	0	104.11196	0.632
Adelaide Airport/New Terminal Finance		Straight Call - in last year						
AU3FN0010500	Fixed equivalent yield							Change
Date	Call date (16/6/14)	Final maturity (15/09/15)	Option Premium	Clean Price	Final maturity (15/09/15)	Option Premium	Clean Price	in Yield
8/04/2010	5.7692	6.4259	-2.3293	109.23798	5.9306	0	111.56727	0.495
22/04/2010	5.9022	6.5418	-2.3385	109.6225	6.0396	0	111.96063	0.502
6/05/2010	5.5622	6.1948	-2.374	109.52309	5.686	0	111.89693	0.509
AXA SA		Fixed to Call date, then floating with margin						
AU0000AXJHB7	Fixed equivalent yield							Change
Date	Call date (26/10/16)	Final maturity (29/12/49)	Option Premium	Clean Price	Final maturity (29/12/49)	Option Premium	Clean Price	in Yield
8/04/2010	12.1383	10.4337	-3.9328	80.77439	10.3941	0	81.46176	0.040
22/04/2010	12.2866	10.4728	-4.1041	84.06255	10.3703	0	81.13557	0.102
6/05/2010	12.0689	10.1672	-4.7414	81.18459	10.0294	0	82.3194	0.138

Terms of reference:

5. Referring to the graphs appearing at Figure 8 and 12 of the CEG report (on pages 26 and 32):

   a. briefly describe the general pattern of yields for callable and non-callable bonds:

      i before accounting for the value of call options; and

      ii after accounting for the value of call options as estimated in your answer to question (4) (b) above.

   b. briefly set out what are, in your view, the key reason(s) for the different relative yields of each of the callable bonds and each of the non callable bonds.

51. Within the sample group of bonds shown in Figure 8 and 12 the bonds contain a mixture of call options, make whole options and step up coupon options and are a mixture of fixed and floating. As presented in our analysis of Question 4, 8 of 31 bonds actually have any value to the embedded option, therefore not materially affecting the sample.

52. In our discussion of Question 2 we detail quite thoroughly the impact of the differing types of the options above could have on the yields of the bonds in the sample,

53. Within the sample bond selection, not necessarily referring to the figures 8 and 12, we can state the following:

    - Callable and non callable bonds, where the value of the optionality is zero, should trade at the same level.

    - Bonds with call options in them that are Floating Rate Notes do not always have any embedded option value and would not trade at elevated levels this is because the interest rate is reset on a periodic basis and falling rates are immediately available to the issuer thereby not providing an incentive to call the bond[13].

    - If a bond has a call option with some value in the embedded option it would trade at a higher price, lower yield if the value of the optionality were removed. This is clearly shown in the analysis of Question 4.

    - The optionality contained in a bond structure does not always impact the price/yield for a bond, e.g. make whole or step up coupons, they are just added to make the bond more appealing to investors. Being more appealing may make the bond more saleable and at a differing price/yield to which it may otherwise trade but this would appear to be not quantifiable.

54. All bonds, whether callable or not, will trade at different levels as not all debt market practitioners will assess the bonds equally. As previously described not all bond valuation is logic and quantitative analysis, there is a high degree of qualitative analysis involved and many variables that are considered when the market determines the relative yield of one bond versus another.

55. With the bonds contained in the CEG report and presented in figures 8 and 12 of the CEG report on pages 26 and 32[14], we can opine the following to be key considerations for differing yields in this sample of bonds.

    - Underlying differences in financial strength of individual companies.

    - Differences in perception of liquidity, e.g. a Bank of Queensland bond would be considered to be more liquid than a Dalrymple bond and therefore trade at a lower relative yield.

    - Market practitioners may not have been able to buy all the bonds equally across the sample, those with greater liquidity would naturally trade with lower relative yields.

    - Differing views on the prospects for each company can be based on differing industry segment. The bonds analysed were across a number of differing industries such as banking, insurance, airports, coal, energy, all with differing prospects and outlooks. Analysing the data in both figures, but in particular figure 8, does show there are three broad groupings of securities by industry type. There are three tiers of yields illustrated in the following chart, adapted from Figure 8 in the CEG report. The three industry groups are; Financial Institutions/Insurance represent the first tier which, on average, have higher yields (during the averaging

[13] Paragraph 49, CEG report
[14] CEG report, Figure 8 and 12

period) than the other bonds being examined; Infrastructure, whose bonds have yields, on average, between the two other industry types; and Corporations, which, on average, have the lower yields.

Financial Institutions
The first tier is primarily insurance companies such as Promina, AXA and Swiss and banks. Investors, at that time were unsure on the prospects of insurers hence demanding an extra return for investing in that sector.

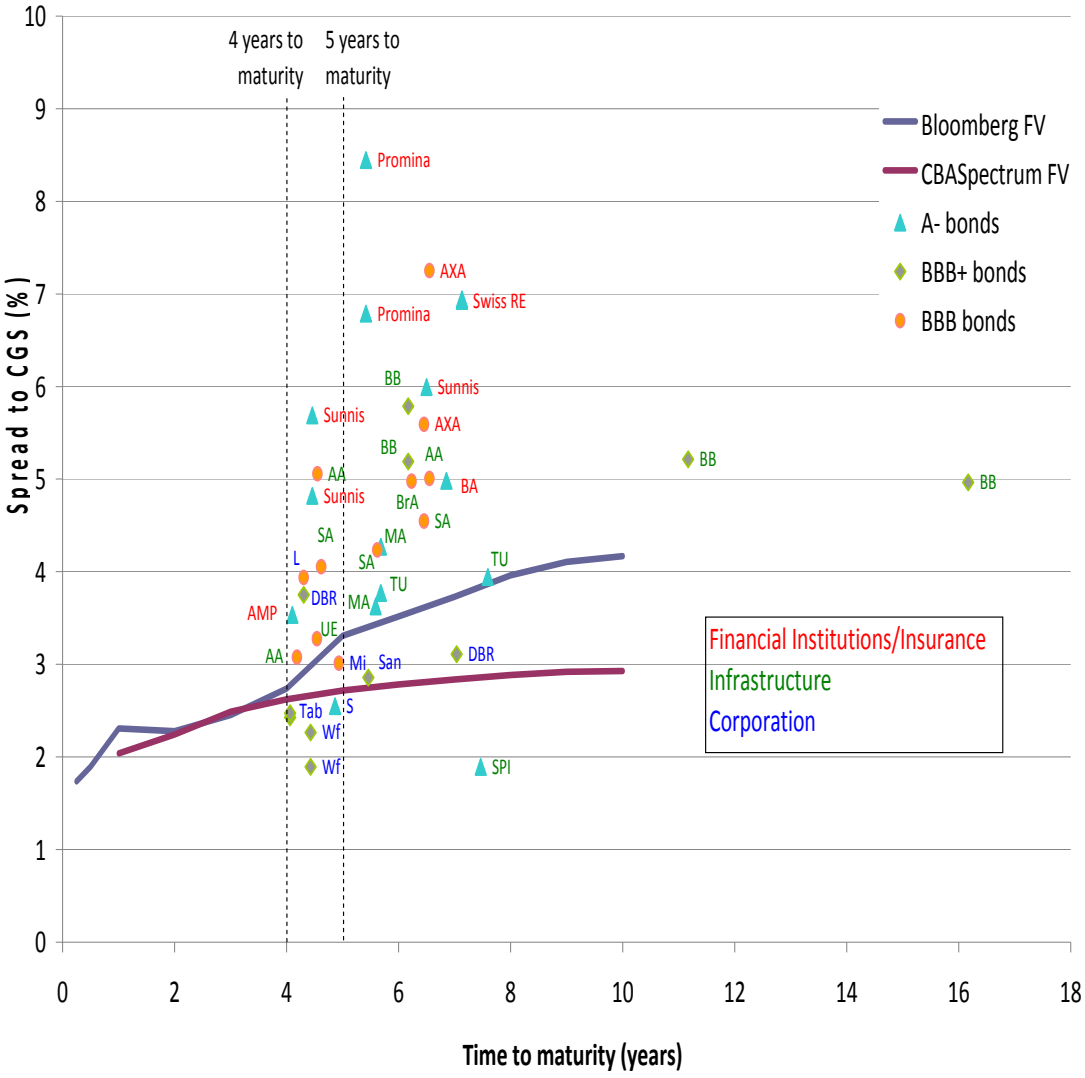
Infrastructure
The middle tier is primarily infrastructure linked organisations, such as Sydney, Melbourne and Adelaide Airports. These are organisations which reply primarily upon one infrastructure project or group of similar infrastructure projects.

Corporation
The lower group is primarily well known Australian corporations, such as Wesfarmers, Santos, DB REEF. These are publicly listed companies with a wide range of activities and assets.

- There are two organisations which could fit in two categories, Transurban and SPI. Both have been classified as infrastructure but do share many of the features of those categorised as corporations. They have been classified into the infrastructure group as even through they have a number of different assets, a vast majority are in one sector, toll roads for Transurban and electricity and gas distribution for SPI. Additionally, a majority of the revenue generated by both of these groups of assets are regulated.

The three industry groups are presented as a helpful explanation of relative bond yields, but Oakvale does not consider that the industry grouping is the sole determinant of any particular bond yield, as outlined in paragraphs 3 and 4 there are many other variables that contribute to a bonds yield.

Reformatted Figure 8 (CEG report) – Median reported spread to CGS on all bonds rated BBB to A- with greater than four years maturity



Infrastructure		*Corporation*		*Financial Institutions/Insurance*	
SPI E & G	SPI	Tabcorp	Tab	AMP	AMP
Adelaide Airport	AA	Wesfarmers	Wf	Promina	Promina
United Energy	UE	Stockland	S	AXA	AXA
Sydney Airport	SA	Mirvac	Mi	Bank of America	BA
Transurban	TU	Santos	San	Swiss Re	Swiss Re
Melbourne Airport	MA	DB Rreef	DBR	Sunins Sub	Sunnis
BBI DBCT	BB	Leighton	L		
Brisbane Airport	BrA				

Pricing factors for specific bonds

DBCT Bonds

Terms of reference:

6. Specifically consider the bonds relating to the Dalrymple Bay Coal Terminal (previously issued by Babcock and Brown Infrastructure, now Prime Infrastructure) with particular reference to the 2021 DBCT bond:
    a. identify all relevant features that would be considered by a debt market practitioner when determining the price (yield) of these bonds;
    b. provide your opinion of why these bonds were valued at their particular prices during the relevant averaging period; and
    c. estimate the price (yield) on these bonds across the relevant averaging period in the absence of 'make whole' call options.

Credit Aspects

56. The Bond used for this question is DBCT June 2021 bond, ISIN AU300BBIF034, (key details in Appendix G). The other bonds from this issuer mentioned in the CEG report all have the same qualities, bar their maturity date and the coupon rates applicable. These are the qualities which would be considered when determining the price of this bond:

- Term to maturity – bonds with longer maturities will normally require a higher return; longer term bonds may be beyond an investor's portfolio mandate for their investments. For example, most investor groups, that includes but are not limited to financial institutions, corporate clients, retail investors, superannuation funds, charities, hedge funds, fixed income investment funds, insurance companies, are limited by mandates that prohibit investments beyond three or five years. If a company issued ten year bonds, large parts of the potential investor pool would be unable to buy the debt, regardless of the risk metrics involved. Therefore, a company looking to issue longer term bonds would need to offer these bonds at a premium to a) attract the reduced pool of investors and b) compensate investors for the resulting lack of secondary market liquidity in the bond issue.
- Credit rating – all things being equal, the more highly rated a bond the lower the yield should be. A key point of differentiation is whether a bond is investment grade or not, i.e. is the rating above BBB, as a vast majority of investment mandates preclude investments with sub investment grade ratings. Investors often have a ratings profile that must be maintained within their portfolio mandate for investing. A review of the current credit rating and available credit reports from Rating Agencies would be considered.
- Credit margin – is the credit margin in line with current trading activity or future expectations for the issuer by the buyer.
- Issue size – is the issue large enough to support secondary market activity.
- Credit wrap feature – does the bond have any credit wrap features, what is the strength of the name of the institution providing the credit wrap and what level of support the credit wrap actually provides the bond?

- 'Make whole" call option feature – provides added support to the issue but only from an investor "comfort" perspective.
- Pricing comparison to peers – how is the issue priced compared to other similarly rated issuers and those within its peer group (industry).

Liquidity Aspects

- Market sentiment – does the market momentum / outlook support investment at the current point in time and what are expectations going forward, in particular investors would consider the economic prospects and the outlook for interest rates.
- Scarcity (Availability) and desirability of issuer – is the issuer constantly issuing, is there over/under supply on the market at the moment, will there be significant issuance in the future.
- Industry prospects – what is the outlook for the Coal industry, export markets, pricing outlook for coal as they relate specifically to the prospects for DBCT.
- Financial standing of company – how is the financial standing of the company and what are its prospects.

57. "Make whole" options are usually incorporated into a bond structure as a sweetener to make the bonds more accessible and appealing to the market place by giving the investor the comfort of essentially offering a capital guarantee or giving power to the investor to claw back any losses. If the "make whole" provision is invoked, the holder typically receives an amount significantly above the debt's current fair market value.

58. The market in reality does not price the option per se.

59. Looking at the combination of qualitative and quantitative analysis as previously described, in our opinion, the factors that an investor would have given greatest weight too, therefore dictating were the bond was priced during the averaging period would be, in no particular order:
    - The value of the Syncora Guarantee Inc. credit wrap, which was essentially worthless as it was experiencing financial difficulties eventually going into receivership, and the strength of underlying make whole option.
    - Market conditions at the time, especially the restructure events around Babcock and Brown and continued uncertainty about global recovery would have had a negative impact for the bond's yield.
    - Strength of the commodity markets for the products moving through Dalrymple was positive. Although this may not have decreased the yield on the bond, the commodity market outlook would not have had a negative impact on the bond's price
    - Is the credit rating likely to be placed under review and the term to maturity. The former was under market scrutiny at the time (even though as noted in the CEG report paragraph 31 that the rating was affirmed by S&P[15] in February 2010 which would have given investors some confidence but not completely eradicated investor risk as S&P ratings were still being scrutinized by the market) and the term to maturity being 10 years implies less liquidity in that part of the curve if the buyer wishes to exit at some stage in the future. Both of these factors would have resulted in less liquidity and demand for the bond and consequently caused its yield to be higher.

[15] www.standardandpoors.com

60. During the averaging period, with the threat of the default or restructure being present for the Babcock and Brown infrastructure bonds, the value of the make whole option would be significant as investors would be compensated, or "made whole" by an amount significantly above the debts current fair value based on the issuers current spread over swap. If there was no threat of default or restructure then the value of the "make whole " option would essentially be zero and the bond yields would be the same as with straight debt.

61. During the averaging period, the price of this bond was providing a yield which was higher than most of the other BBB+ bonds observed (in the CEG report), this was most likely due to the uncertainty surrounding the issuer and the future status of the issue and not a direct function of the specific features of the bond.

62. During the averaging period it is unlikely Oakvale would have recommended the DBCT bond for any investment portfolio as it is viewed to have higher risk characteristics than other similar rated bonds..

SPI Bond

Terms of reference:

7. Specifically consider the bond issued by SPI Electricity and Gas:
    a. identify all relevant features that would be considered by a debt market practitioner when determining the price (yield) of this bond;
    b. provide your opinion of why this bond was valued at its particular price during the relevant averaging period; and
    c. estimate the price (yield) on this bond across the relevant averaging period in the absence of the 'coupon reset on rating downgrade' characteristic.

Credit Aspects

63. Bond used for this question is SPI September 2017 bond ISIN AU3CB0145696 (details in Appendix H)

- Term to maturity – bonds with longer maturities will normally require a higher return; longer term bonds may be beyond an investor's portfolio mandate for their investments. For example, most investor groups, that includes but are not limited to financial institutions, corporate clients, retail investors, superannuation funds, charities, hedge funds, fixed income investment funds, insurance companies, are limited by mandates that prohibit investments beyond three or five years. If a company issued ten year bonds, large parts of the potential investor pool would be unable to buy the debt, regardless of the risk metrics involved. Therefore, a company looking to issue longer term bonds would need to offer these bonds at a premium to a) attract the reduced pool of investors and b) compensate investors for the resulting lack of secondary market liquidity in the bond issue.
- Credit rating – all things being equal, the more highly rated a bond the lower the yield should be. A key point of differentiation is whether a bond is investment grade or not, i.e. is the rating above BBB, as a vast majority of investment mandates preclude investments with sub investment grade ratings. Investors often have a ratings profile that must be maintained within their portfolio mandate for investing. A review of the current credit rating and available credit reports from Rating Agencies would be considered.
- Credit margin – is the credit margin in line with current trading activity.

- Issue size – is the issue large enough to support secondary market activity and within my portfolio mandate for investment.
- Coupon step-up in event of ratings downgrade – how does this compare to market implied pricing and what is the likelihood of a downgrade.
- Pricing comparison to peers – how is the issue priced compared to other similarly rated issuers and those within its peer group (industry).
- Perceived parental group support and analysis of the strength of the company guarantees.

Liquidity Aspects

- Market sentiment – does the market momentum / outlook support investment at the current point in time and what are expectations going forward, in particular investors would consider the economic prospects and the outlook for interest rates.
- Scarcity (Availability) and desirability of issuer – is the issuer constantly issuing, is there over/under supply on the market at the moment, will there be significant issuance in the future.
- Industry prospects – what is the outlook for the energy markets, in particular the electricity/gas segment.
- Financial standing of company – how is the financial standing of the company and what are its prospects.

64. Bonds issued with a "coupon reset on downgrade" are often issued for a number of reasons, but primarily the tool is used to make the issue more attractive to a wider investor base, especially as the SPI bond issuance in question had a 7 year maturity, which is considered longer term. Typically the investor pool for fixed income securities have credit rating and tenor restrictions and the additional coupon support on downgrade is aimed at improving the marketability of the bond.

65. Below is the table of coupon reset on downgrade for the SPI September 2017 bond ISIN AU3CB0145696. The bond was issued in March 2010 shortly before the averaging period with an A- rating.

7.50% plus a rating step up or step down margin in accordance with the following table:

Rating (or equivalent)	Applicable percentage adjustment per Rating Agency ("Adjustment")
Baa2/BBB	0.25
Baa3/BBB-	0.50
Ba1/BB+ (or lower)	1.00

66. Looking at the combination of qualitative and quantitative analysis as previously described, in our opinion, the factors that an investor would have given greatest weight

too, therefore dictating were the bond was priced during the averaging period would be, in no particular order:

- Strength of the company guarantee, this was a key driver in the where the bond traded as market perception (the qualitative analysis) is that the risk is in fact the risk of the Government of Singapore.
- Market conditions at the time, some uncertainty around global growth prospects.
- Strength of the energy market and Australia's economic prospects.
- Is the credit rating likely to be placed under review and the term to maturity, the former was not under pressure at the time as it was only just issued and the term to maturity being 7 years implies less liquidity in that part of the curve if the buyer wishes to exit at some stage in the future?

67. During the averaging period the bond, without the coupon reset feature, should, in theory, trade at a slightly higher yield (equivalent to at least the step up coupon), as investors would not have the compensatory effect of a higher yield should a downgrade occur. However, given the bond was issued so close to the averaging period and there was no sign of any downgrade, it was unlikely that investors gave much weight to the step up coupon at all. Therefore it is more than possible that the bond, during the averaging period without the step up clause, would not trade significantly differently than it traded with the step up clause.

68. However, without the step up clause, the liquidity of the bond could be reduced as some investors may have bought the bond because of the step up clause and hence the yield required to encourage investment would be higher but this is almost impossible to calculate.

69. During the averaging period the bond was attracting one of the lowest yields, in contrast to other A- bonds observed (as per the CEG report). The key feature supporting the bond was the parental support of the issuer's owners and the link to the Government of Singapore.

70. During the averaging period it is likely Oakvale would have recommended the SPI bond for clients looking for a risk averse corporate name with these rating qualities.

Debt market conventions

Terms of reference:

8. Comment on the interpretation of data from financial data providers (such as Bloomberg, CBA Spectrum and UBS) with specific regards to:
    a. Conventions for yield reporting; and
    b. Conversion of fixed to floating.

71. Whilst Bloomberg and CBA Spectrum provide useful price guidance, the use of a market makers price sheet such as that provided by UBS is the most commonly used guide for pricing of bond instruments, whether fixed, floating or hybrid structures. AFMA pricing sources are increasingly being used by market practitioners.

72. Bloomberg often uses composite quotes (i.e. where they believe the market should be), whereas market practitioners use pricing models and actual data flow for pricing and this is deemed more reliable.

73. The pricing methodology used by UBS on their pricing rate sheet is reprinted below and is from their 22nd April 2010 rate sheet:

    "*In line with primary issuance pricing methodology which has been adopted by the market, the Mid Swap column calculations on the rate sheet has been changed to S/Q basis in order to reflect a true asset swap margin. This has not impacted yields or prices.*

    For securities in which the market is currently not transparent, each security is priced according to indicators, which include CDS levels, global comparative bonds, customer feedback and market news. We welcome your feedback on the index closing levels and continue to update levels according to market information when market action is sparse."

74. In paragraph 123 of the CEG[16] report the actual floating rate bond is converted to an equivalent fixed yield for comparison purposes. As stated in the report, paragraph 122[17], two bonds, whether fixed or floating, should be unbiased proxies for each other otherwise arbitrage opportunities would exist.

75. This comparison is always done in the market place and can be best illustrated when looking at new issues. Typically a new issue would have a fixed coupon or floating rate coupon option and when an investor compares the overall return on the day of issue, if the investment is held to maturity, the returns of either bond should be equivalent, otherwise an arbitrage opportunity exists.

76. Yields are always quoted on an annualized basis i.e. the rate represents the yield assuming the security is held for one year. These rates can have different frequency of payments, for example, annual, semi annual, quarterly or monthly. The frequency set in the market will impact the return represented by the yield, this is called the

[16] See paragraph 123, CEG Report, Estimating the 10 year BBB+ cost of debt, A report for JGN, Tom Hird (PhD) December 2010
[17] See paragraph 122, CEG report, Estimating the 10 year BBB+ cost of debt, A report for JGN, Tom Hird (PhD) December 2010

compounding effect. In other words, the higher the frequency of coupon payments the more opportunity the investor has to reinvest the funds to generate more interest. The formula for changing from an annual percentage rate to a semiannual, quarterly, or monthly one is:

$$\text{Effective Rate} = (1 + (i / n))^n - 1$$

Where:

i = nominal or stated interest rate

n = number of compounding periods per year

77. For example, the effective rate of a stated annual rate of 6% yield when compounded semi annually is 6.09%, so to equalise the yields between an annual rate and a semi annual rate the semi annual rate would be 6% and the annual rate would be 6.09%.

Appendix A – Net Present Value (NPV) bond formula

$$P = C\left(\frac{1-(1+i)^{-N}}{i}\right) + M(1+i)^{-N}$$

Where:

- F = face value
- i_F = contractual interest rate
- C = F * i_F = coupon payment (periodic interest payment)
- N = number of payments
- i = market interest rate, or required yield
- M = value at maturity, usually equals face value
- P = market price of bond

Appendix B – International Securities Market Association bond formula

$$P = v^{\frac{r_1}{s}} \left\{ d_1 + d_2 \times v + \frac{c}{h} \times \frac{v^2 \left(1 - v^{n-1}\right)}{(1 - v)} + \left[100 + cpn^*\right] \times v^{n + \frac{r_2}{s}} \right\}$$

Where:

- P = Dirty price (clean price plus accrued interest) of the bond per 100 units face value
- r_1 = Number of days from settlement date to next nominal coupon payment date (based on the appropriate accrual convention)
- r_2 = Number of days from date of the last 'normal' coupon payment to Maturity Date (based on the appropriate accrual convention) - zero if the bond does not have an odd final period
- s = Number of days in relevant coupon payment period (based on the appropriate accrual convention)
- d_1 = First/next coupon payment. For an odd first period, this amount may differ from the standard coupon payment. It may also equal zero if the bond is trading ex-coupon.
- d_2 = Coupon payment due on the next-but-one nominal payment date. For bonds with an odd first period, this amount may differ from the standard coupon payment
- c = Annual coupon payment per 100 units of face value
- cpn* = Final coupon amount for a bond with an odd final period. This is zero for all other bonds
- h = Number of coupon periods in a year
- n = Number of full coupon periods remaining until redemption. The number of remaining coupon payments is therefore equal to n+1.
- v = Discount factor for one period, 1/(1+y/h)
- y = Required annual nominal redemption yield, expressed as a decimal

Appendix C – Floating Rate Note (FRN) Formula

$$P = \frac{\left[c*(b + IM)*\frac{d}{365} + \left[\frac{IM - TM}{t}\right]*a_n + 1\right]*100}{1 + \frac{(r + TM)*f}{365}}$$

Where:

- c = 0 if traded ex interest, 1 if traded cum interest
- b = Base index value (BBSW) at the time the current coupon was set
- r = Index rate (BBSW) from settlement until the next coupon payment date
- s = Long-term interest rate up to the FRN maturity (using a compounding frequency equal to the coupon frequency of the FRN)
- d = Number of days in the current coupon period
- f = Number of days from settlement until the next coupon date
- n = Number of complete coupon payment periods after the end of the current coupon period
- IM = Interest margin (coupon margin) that the FRN pays above the index
- TM = Discount margin (trading margin) at which the security is currently trading above the index
- a_n = (1-vn)/i
- v = 1/(1+i)
- i = (s+TM)/t
- t = Number of coupon payments per year

Appendix D – iTraxx Australia

General Rules

I. The iTraxx® indices are owned, managed, compiled and published by International Index Company Limited/Markit.
II. The roll date for each index is March 20th and September 20th. The new indices start on the roll date, or the following business day if the roll date is not a business day.
III. Upon each roll the index will launch with a 5¼ maturity. The maturity date is always June 20th for the roll in March and December 20th for the roll in September.
IV. Entities are weighted equally in all indices. If the number of index constituents cannot be divided equally to two decimal places, weighting adjustments (+/- 0.01%) are made in alphabetical order.
V. All data and information submitted by market makers to Markit are treated in strict confidence.

Index Construction
The iTraxx® Australia index comprises 25 investment grade rated entities.

Liquidity Poll

Each market maker submits to Markit a list of the most liquid traded entities based on the following criteria:

- Trading volumes of each entity are aggregated by market makers
- Trading volumes of the past 12 months are used
- For bank names, both subordinated and senior volumes are combined
- All internal transactions are excluded from the volume statistics, e.g. those with an internal prop desk

Membership determination

- The entity, the parent company of the entity or a subsidiary of the entity has to be listed on the Australian Stock Exchange.
- All entities must be rated investment grade by Fitch, Moody's or S&P. This translates into a minimum rating of Baa3 from Moody's and BBB- from Fitch or S&P. If an entity is rated by two or more agencies, the lowest rating is used.
- IIC (International Index Company Limited/ Markit), aggregates the volume ranked lists from market makers to compute final liquidity ranking for each entity. The top 25 most liquid entities are selected from the volume ranked list to comprise iTraxx Australia
- No more than 5 bank entities may be included in the index.

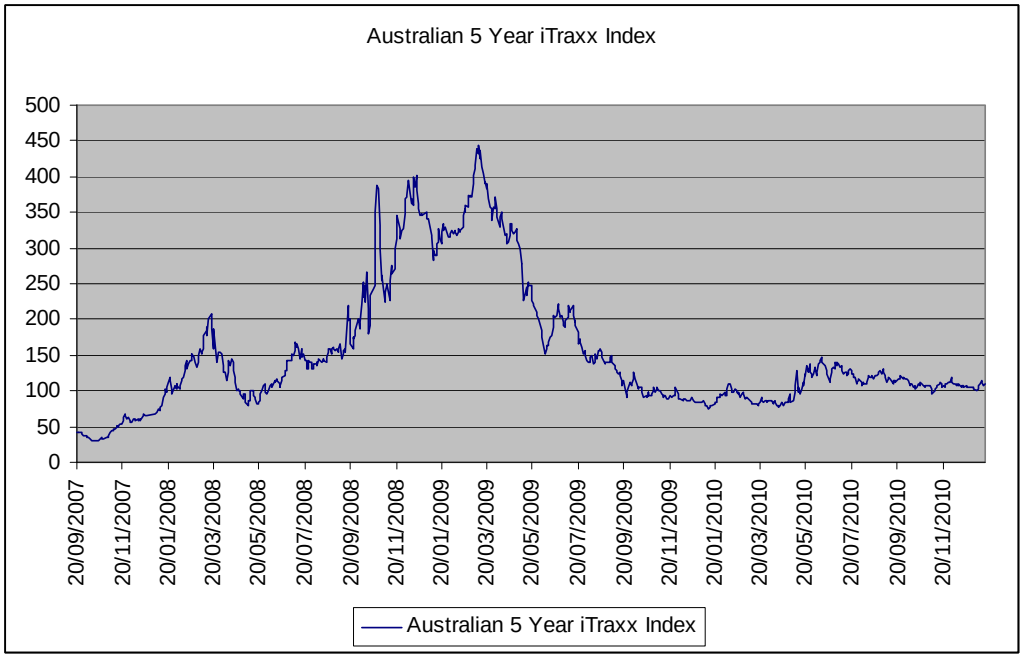
Reference Obligations
The reference obligations for the reference entities are obtained from Markit Group's Reference Entity Database (RED) in conjunction with input from iTraxx market makers. For bank entities sub reference obligations are used.

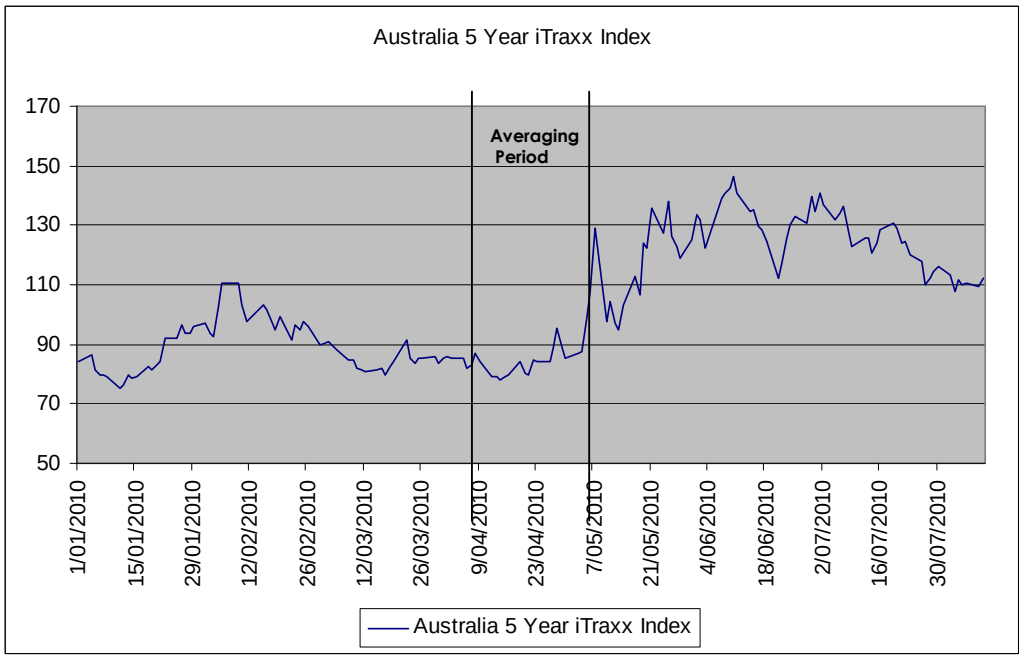
Coupon Levels and Recovery Rates
On the second business day preceding the roll date, a telephone poll is initiated by IIC to determine the coupons and recovery rates for each index. Coupon levels are rounded to the nearest 5 basis points and recovery levels to the nearest 5%.

Appendix E – Analysis of market indices

Australian iTraxx Index

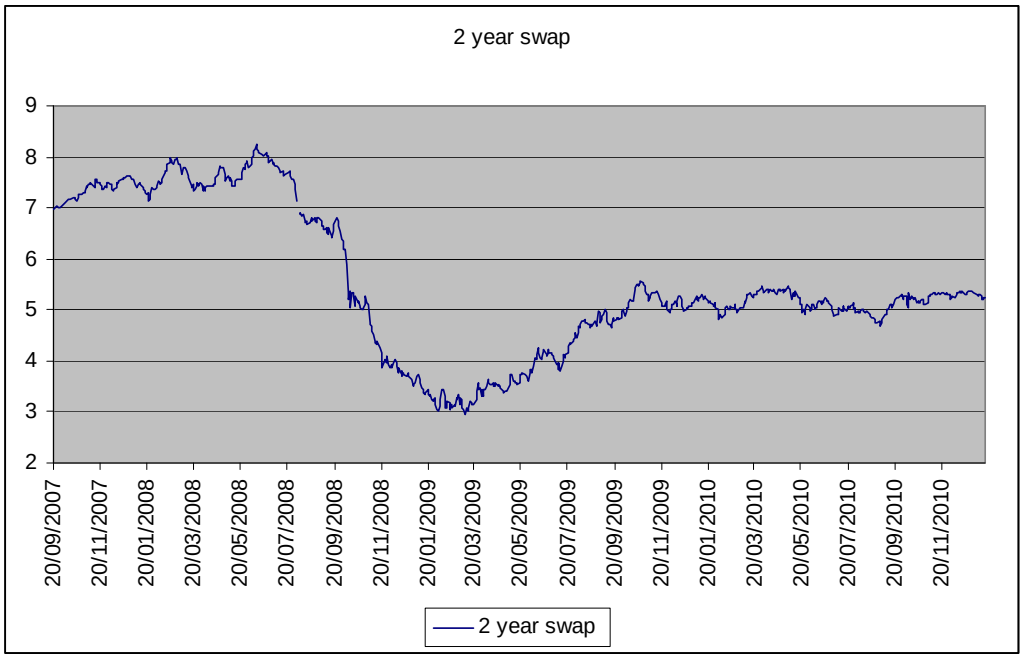
Period	Index average
1st January 2010 – 7th April 2010	90.96
8th April 2010 – 6th May 2010	85.57
7th May 2010 – 10th August 2010	125.80
1st January 2010 – 31st December 2010	107.24

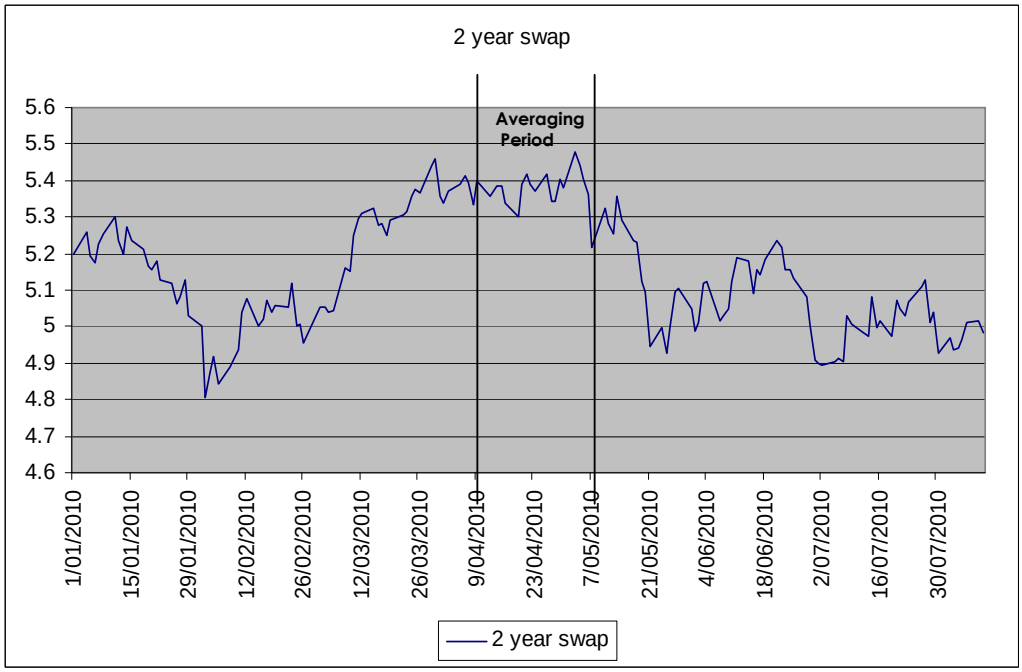




2 year AUD Interest Rate Swaps

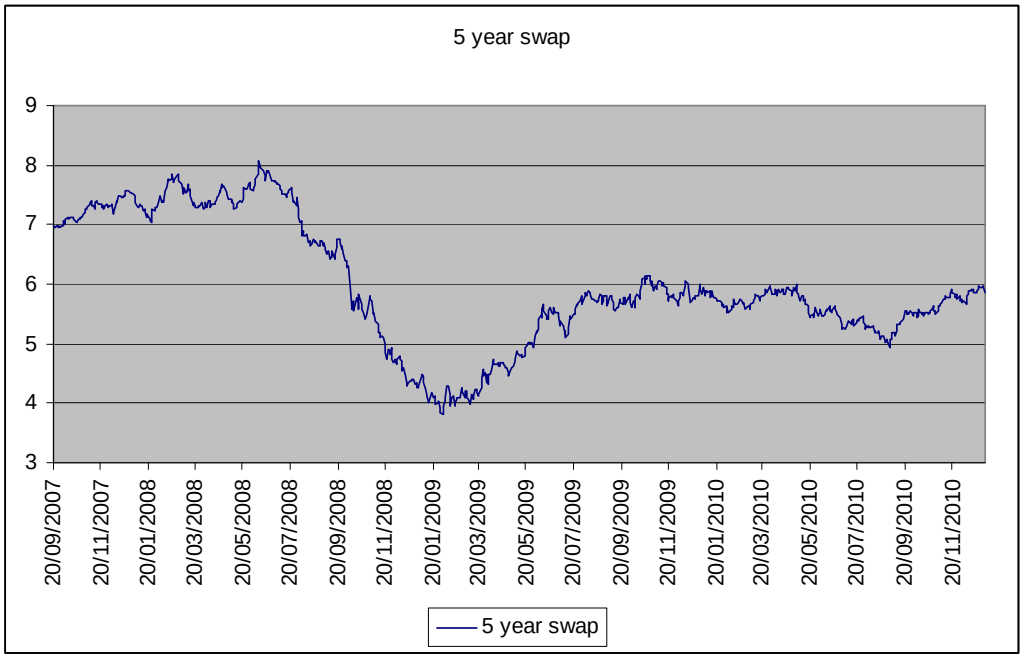
Period	Index average
1st January 2010 – 7th April 2010	5.23
8th April 2010 – 6th May 2010	5.38
7th May 2010 – 10th August 2010	5.0686
1st January 2010 – 31st December 2010	5.16

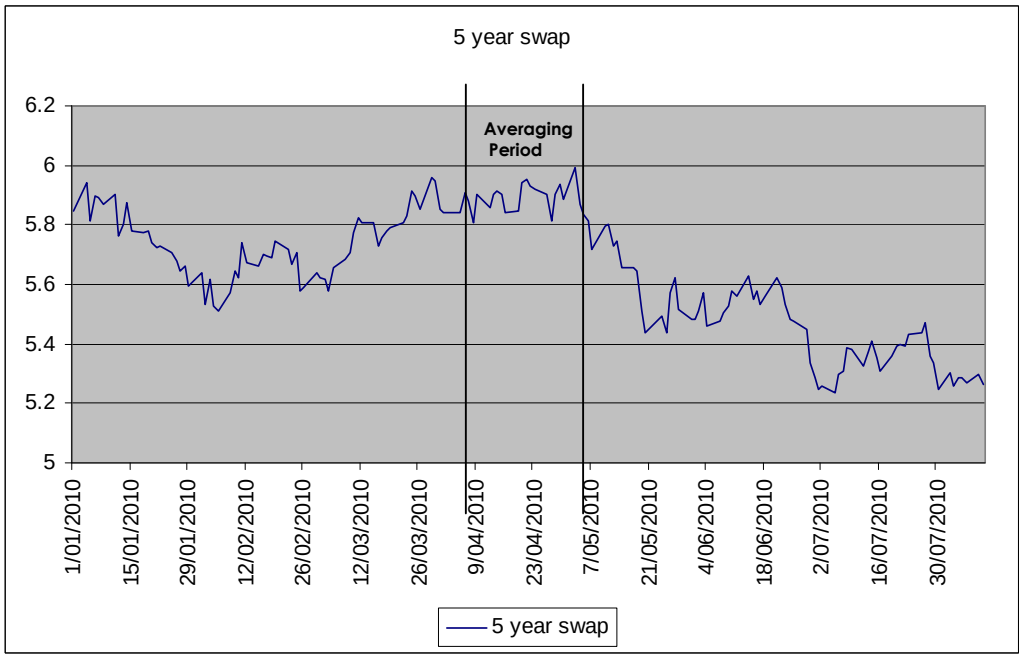




5 year AUD interest rate swaps

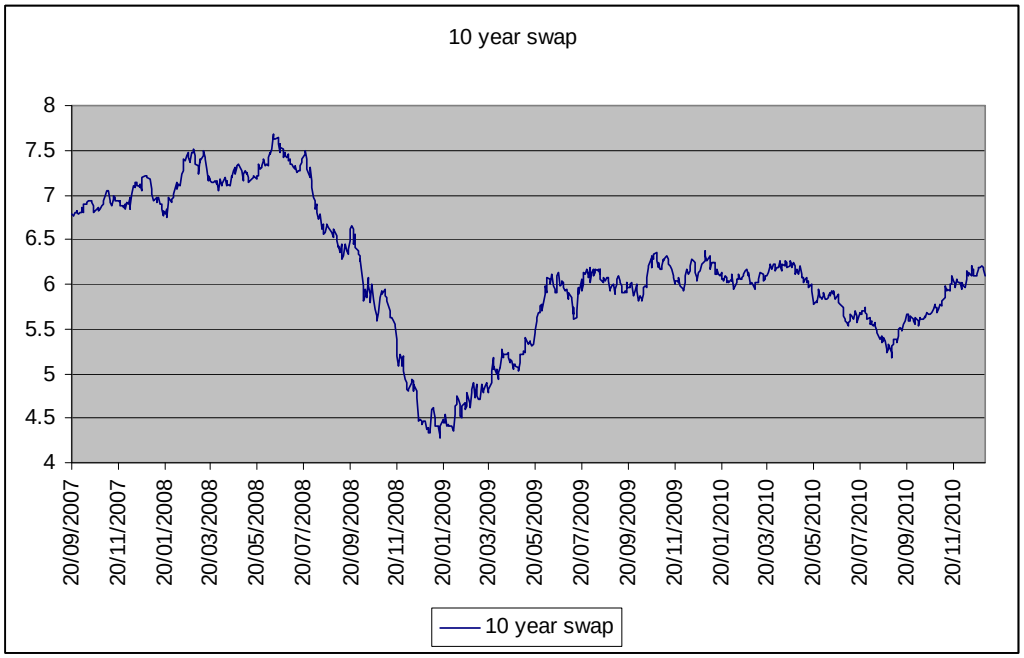
Period	Index average
1st January 2010 – 7th April 2010	5.82
8th April 2010 – 6th May 2010	5.89
7th May 2010 – 10th August 2010	5.46
1st January 2010 – 31st December 2010	5.61

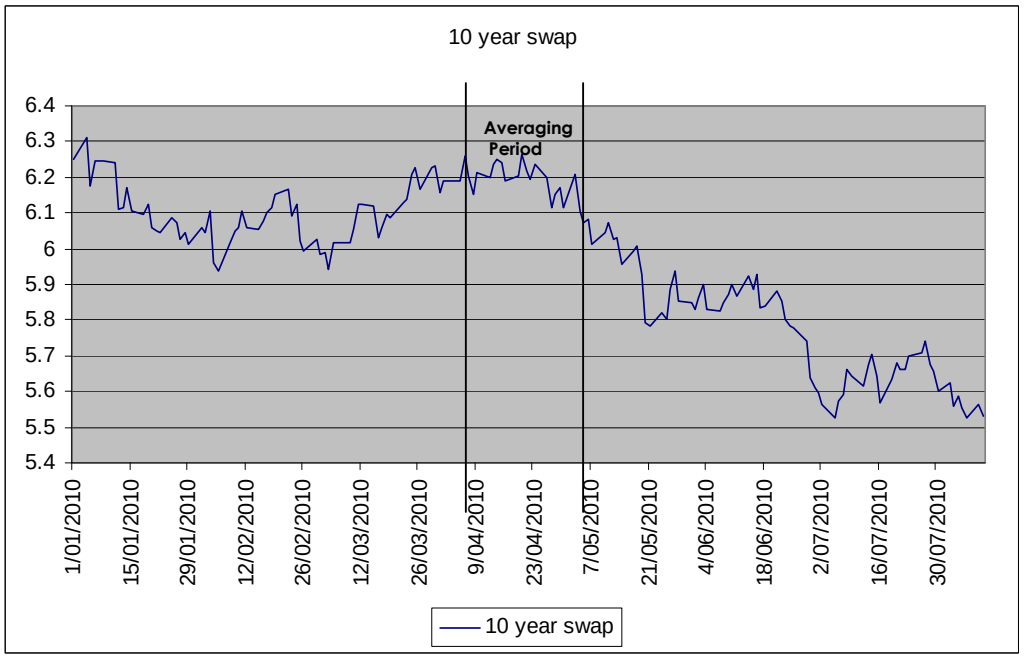




10 year AUD interest rate swaps

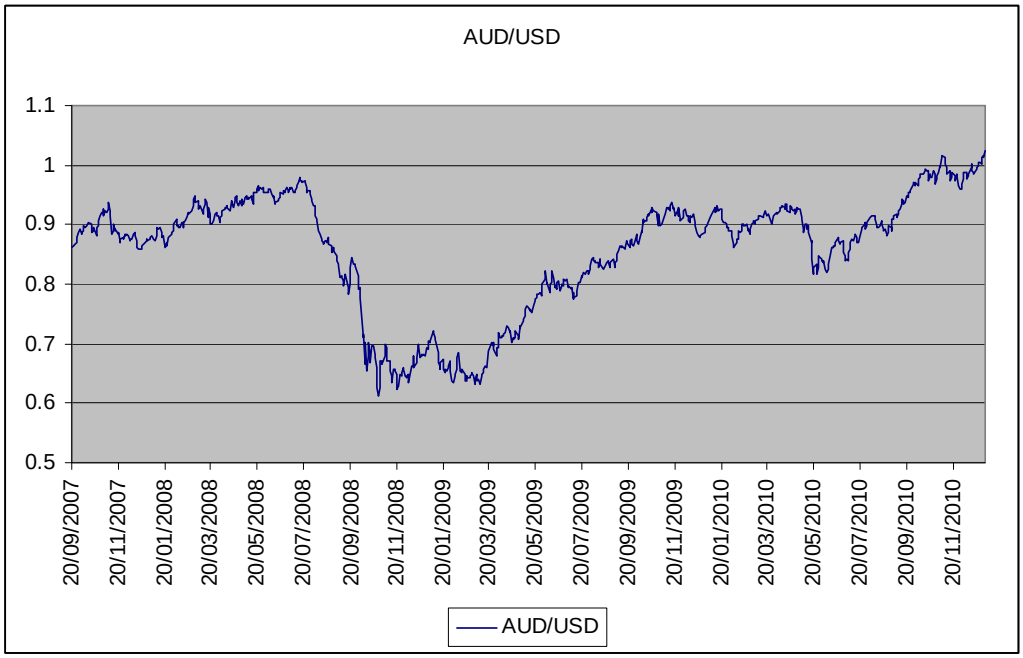
Period	Index average
1st January 2010 – 7th April 2010	6.19
8th April 2010 – 6th May 2010	6.18
7th May 2010 – 10th August 2010	5.76
1st January 2010 – 31st December 2010	5.88

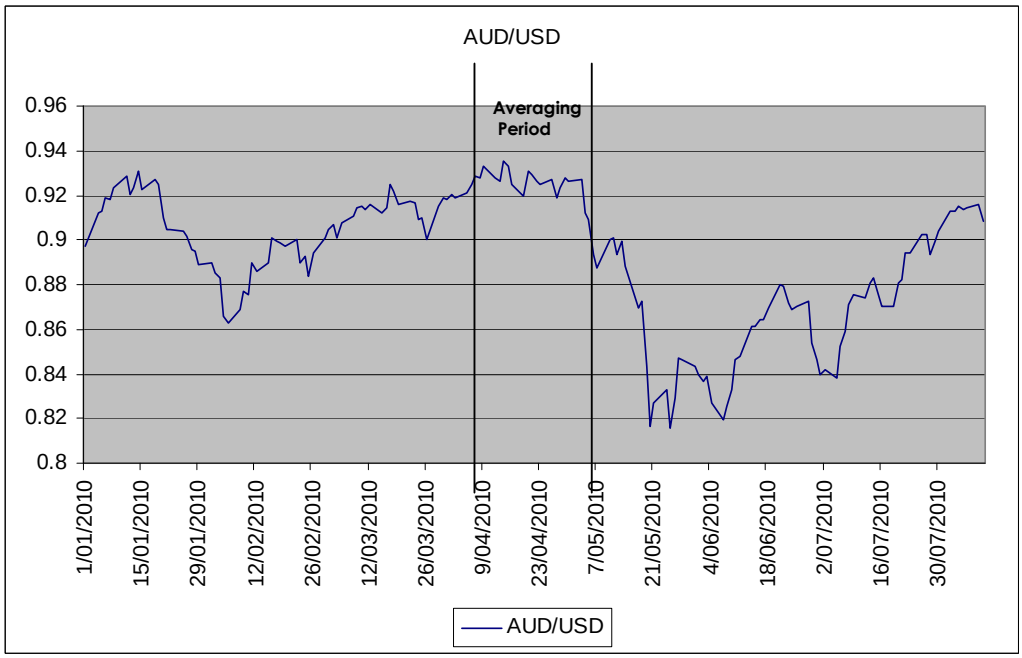




AUD/USD

Period	Index average
1st January 2010 – 7th April 2010	0.9057
8th April 2010 – 6th May 2010	0.9240
7th May 2010 – 10th August 2010	0.8687
1st January 2010 – 31st December 2010	0.9205





Appendix F – Bonds Analysed

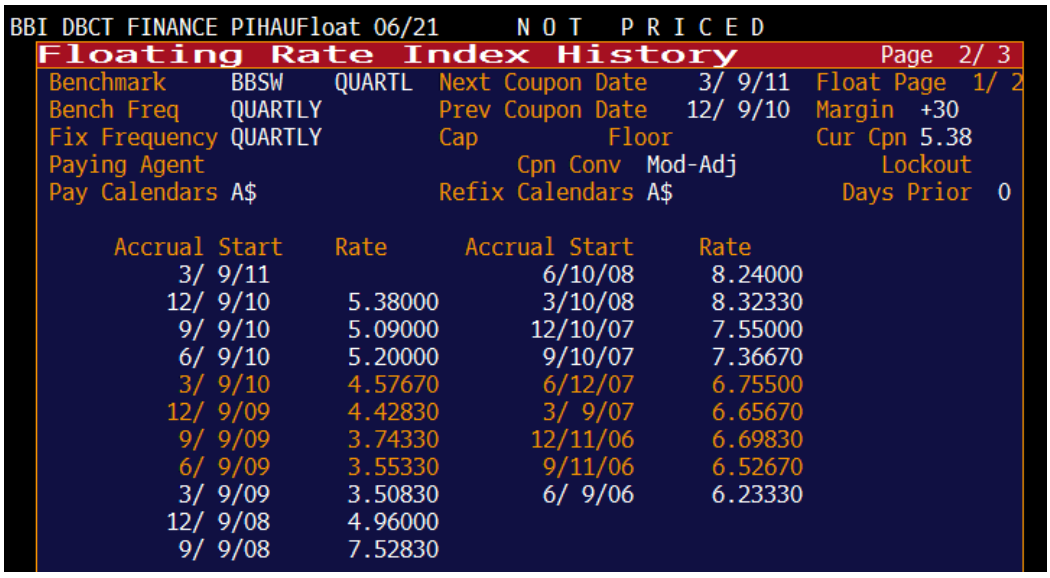
This table shows all bonds that were examined to determine the value of the call option during the relevant averaging period.

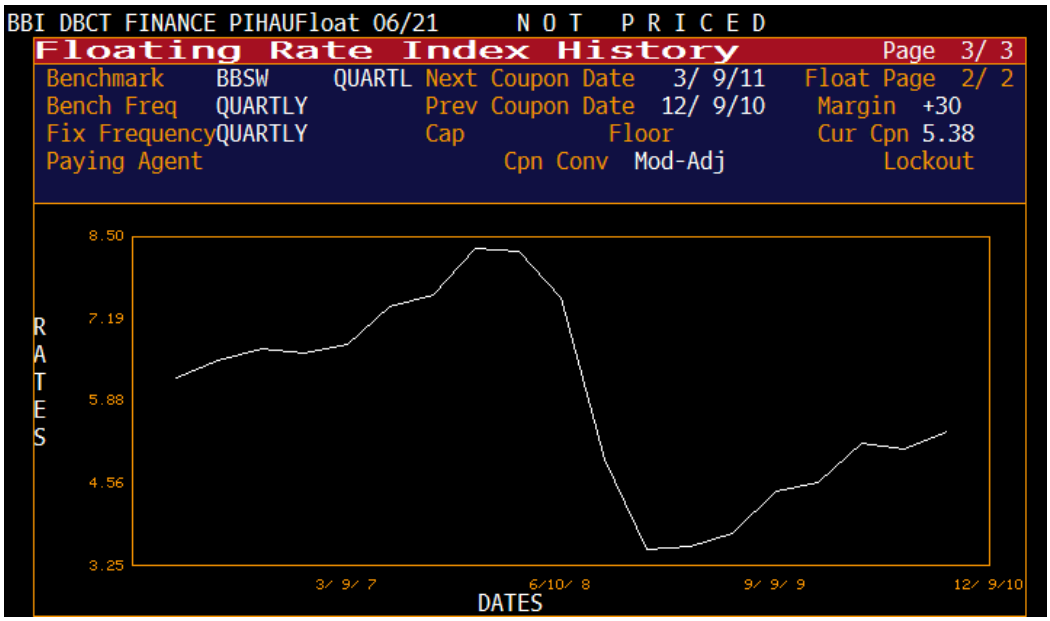
Issuer	ISIN	Embedded Option has value
Suncorp Metway – Subordinated Notes	AU300MET0164	No
Suncorp Metway – Subordinated Notes	AU300MET0172	No
SNS Bank Nederland – Subordinated Notes	AU3FN0000618	Yes
SNS Bank Nederland – Subordinated Notes	AU3CB0006807	No
Macquarie Bank – Subordinated Notes	AU300MQ20318	No
Macquarie Bank – Subordinated Notes	AU300MQ20326	No
AMP Group Financial Services	AU0000AQNHA5	Yes
Suncorp Metway Insurance – Subordinated Notes	AU300SUNQ019	No
Vero Insurance Limited	AU300VERO013	No
Vero Insurance Limited	AU300VERO021	Yes
Suncorp Metway Insurance – Subordinated Notes	AU3CB0003309	No
ELM BV (Swiss Reinsurance Co.)	AU3FN0002531	No
ELM BV (Swiss Reinsurance Co.)	AU3CB0024743	Yes
BBI DBCT Finance	AU3FN0001368	No
BBI DBCT Finance	AU300BBIF026	No
BBI DBCT Finance	AU300BBIF018	No
BBI DBCT Finance	AU300BBIF034	No
BBI DBCT Finance	AU300BBIF042	No
Bank of Queensland – Subordinated Notes	AU300BQ40459	No
Sydney Airport Finance	AU3CB0011021	No
Sydney Airport Finance	AU3FN0001327	No
Bendigo and Adelaide Bank – Subordinated Bonds	AU3FN0001665	No
Royal Bank of Scotland PLC – Subordinated Notes	AU3FN0000790	No
Royal Bank of Scotland PLC – Subordinated Notes	AU3CB0008217	No
Bank of Queensland – Subordinated Notes	AU3CB0072148	Yes
Bank of Queensland – Subordinated Notes	AU3FN0005914	Yes
Sydney Airport Finance	AU3FN0001335	No
New Terminal Financing	AU3FN0010500	Yes
United Energy Distribution	AU300UELM012	No
Royal Bank of Scotland PLC – Subordinated Notes	AU300RSCT020 (*)	No
AXA SA	AU0000AXJHB7	Yes
	AU0000AXJHA9 (**)	

(*) Instead of AU300RSCT012 which could not be found on Bloomberg

(**) Could not be found on Bloomberg

Appendix G – DBCT debt details

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Next Coupon Date 3/ 9/11
Float Page 2/ 2
Bench Freq QUARTLY
Prev Coupon Date 12/ 9/10
Margin +30
Fix Frequency QUARTLY
Cap
Floor
Cur Cpn 5.38
Paying Agent
Cpn Conv Mod-Adj
Lockout
8.50
7.19
5.88
4.56
3.25
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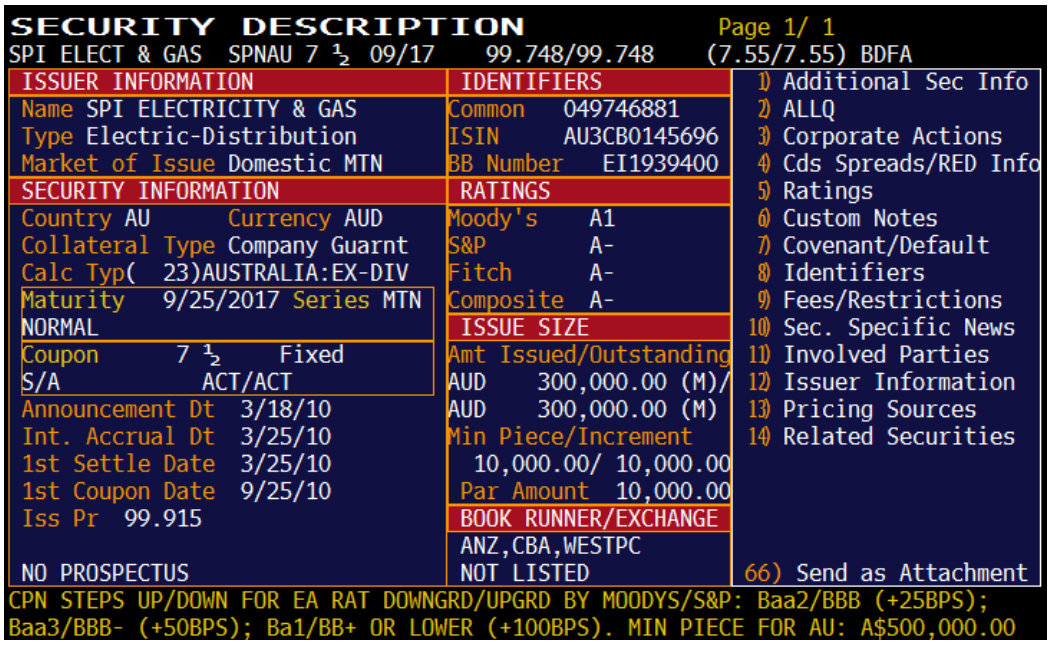
6/10/ 8
9/ 9/ 9
12/ 9/10
DATES

Appendix H – SPI Electricity and Gas debt details



Appendix I – Hull White Factor 1 Model

The Hull-White model is a single-factor, no-arbitrage yield curve model in which the short-term rate of interest is the random factor or state variable. By no-arbitrage, it is meant that the model parameters are consistent with the bond prices implied in the zero coupon yield curve. In addition, yield curve models ensure consistency with the fact that, in the absence of default risk, the price of a bond must pull towards par as it approaches maturity.

The model assumes that the short-term rate is normally distributed and subject to mean reversion. The mean reversion parameter ensures consistency with the empirical observation that long rates are less volatile than short rates. In the special case where the mean reversion parameter is set equal to zero, the Hull-White model reduces to the earlier Ho and Lee model. The use of the normal distribution affords a good deal of analytic tractability, thereby resulting in very fast computation times relative to competing no-arbitrage yield curve models.

The stochastic differential equation describing the form of the Hull-White interest rate model implemented in the software is:

$$dr = \left[\theta(t) - ar\right]dt + \sigma dz$$

where

dr	is the change in the short-term interest rate over a small interval
r	is the short-term interest rate
θ(t)	is a function of time determining the average direction in which r moves, chosen such that movements in r are consistent with today's zero coupon yield curve
a	is the mean reversion rate, governing the relationship between short and long rate volatilities
dt	is a small change in time
σ	is the annual standard deviation of the short rate
dz	is a Wiener process (a drawing from a standard normal stochastic process)

In practice, the Hull-White model is calibrated by choosing the mean reversion rate and short rate standard deviation in such a way so that they are consistent with option prices observed in the marketplace. Empirical values for the "a" parameter (mean reversion rate) are on the order of 0.0 to 0.1 in North America, while the "σ" parameter (short rate standard deviation) tends to be between 0.01 and 0.03. One can use Excel's built-in "Solver" add-in to calibrate these volatility parameters, choosing them such that the mean squared error between the Hull-White model prices and market prices of options are minimized. Sample spreadsheets are available to demonstrate this technique.

The Hull-White Yield Curve Model and Risk Management

In yield curve models such as the Hull-White model, the price of a derivative security is a function of the entire yield curve, rather than a single price as in simpler models like Black-76. The yield curve environment is defined in the Hull-White model by three inputs: a) the zero curve, b) the standard deviation of the short rate, and c) the mean reversion rate [the latter two parameters combine to create the effective volatility].

Single factor models assume that yields for all maturities along the zero curve are instantaneously perfectly correlated. That is, of course, a simplification of reality. As a consequence, it has become accepted practice to "hedge against the model" by computing deltas at various points along the zero curve, thereby gaining insights into the effects of yield curve twists.

Many of the functions in the Hull-White category are designed to facilitate pricing and risk management through the use of bucket shifts of the zero curve. The user can define arbitrary zero curve buckets which are defined by three arguments: Bucket_Start date, Bucket_End date, and Bucket_Shift. These are the last three arguments of many functions in the category. To price an instrument without a bucket shift, set these last three arguments to zero.

Zero curve buckets are designed to include the start date up to, but not including, the end date. It is common to define narrow buckets at the short end of the zero curve, say at monthly intervals, followed by coarser buckets, say at 6-month or yearly intervals.

To solve for the price sensitivity to a shift in the zero curve, price the security with the bucket shift and subtract the price without the shift.

Sensitivity of prices to *parallel shifts* of the zero curve can easily be effected through use of the OAS (option-adjusted spread) argument. As defined here, the OAS is a parallel shift in the continuously compounded zero curve. Using this concept, it is straightforward to create a measure much like the value of a basis point for a bond by calling on a function twice – once with a positive OAS of 1 basis point, and again with a negative OAS of 1 basis point. The average absolute price change is the zero-coupon based value of a basis point.

For securities with fixed or linear payoffs (such as bonds or swaps), the sum of the bucket deltas across the zero curve is equal to an equivalent size OAS shift. This equivalence will not hold for options and bonds or swaps with embedded options, due to option convexity.

The OAS argument can also be used to ensure consistency between the observed spot price of a bond, and the zero curve. If the market price of a bond differs from the price obtained using an OAS of zero (perhaps by a few cents or more), the OAS term can be adjusted in order to fit the market price of the bond. Then, bond option values obtained using this "fudge factor" OAS are more realistic, since the yield curve model is not mispricing the bond (errors in pricing the bond would be magnified when pricing options on the bond, since options are leveraged instruments).

Appendix J – Option Analytics

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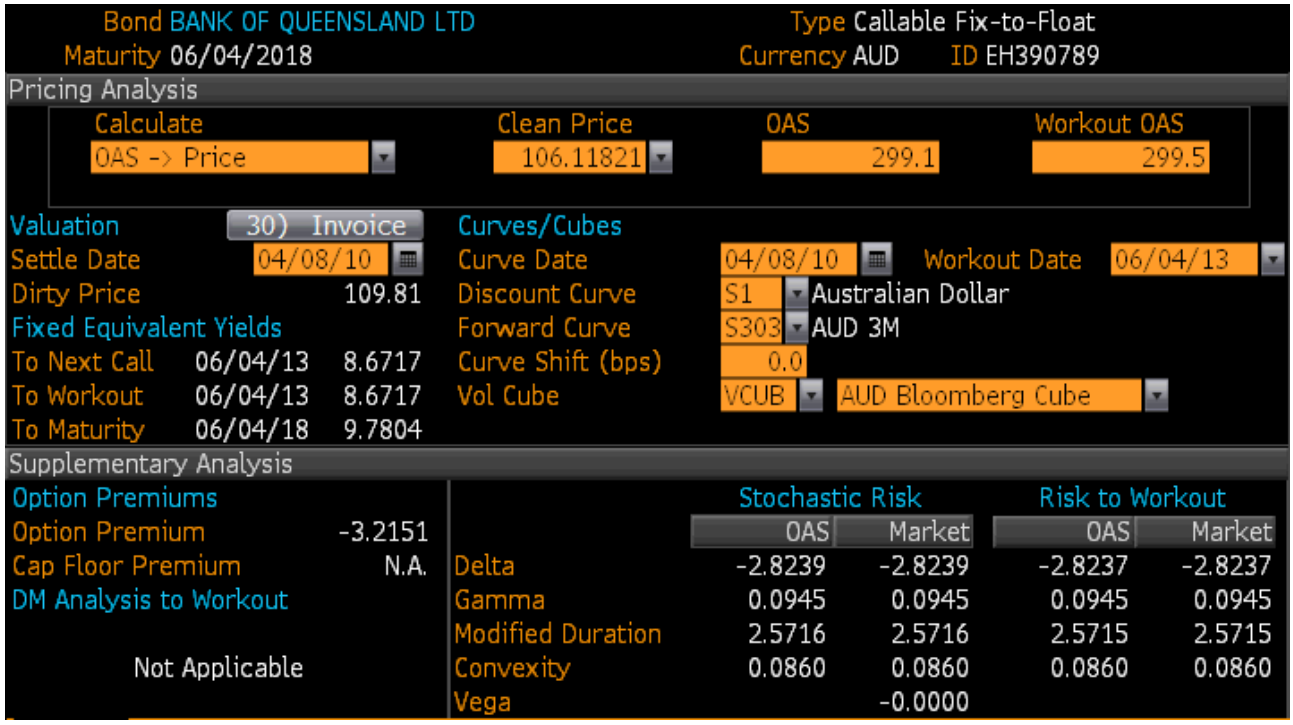
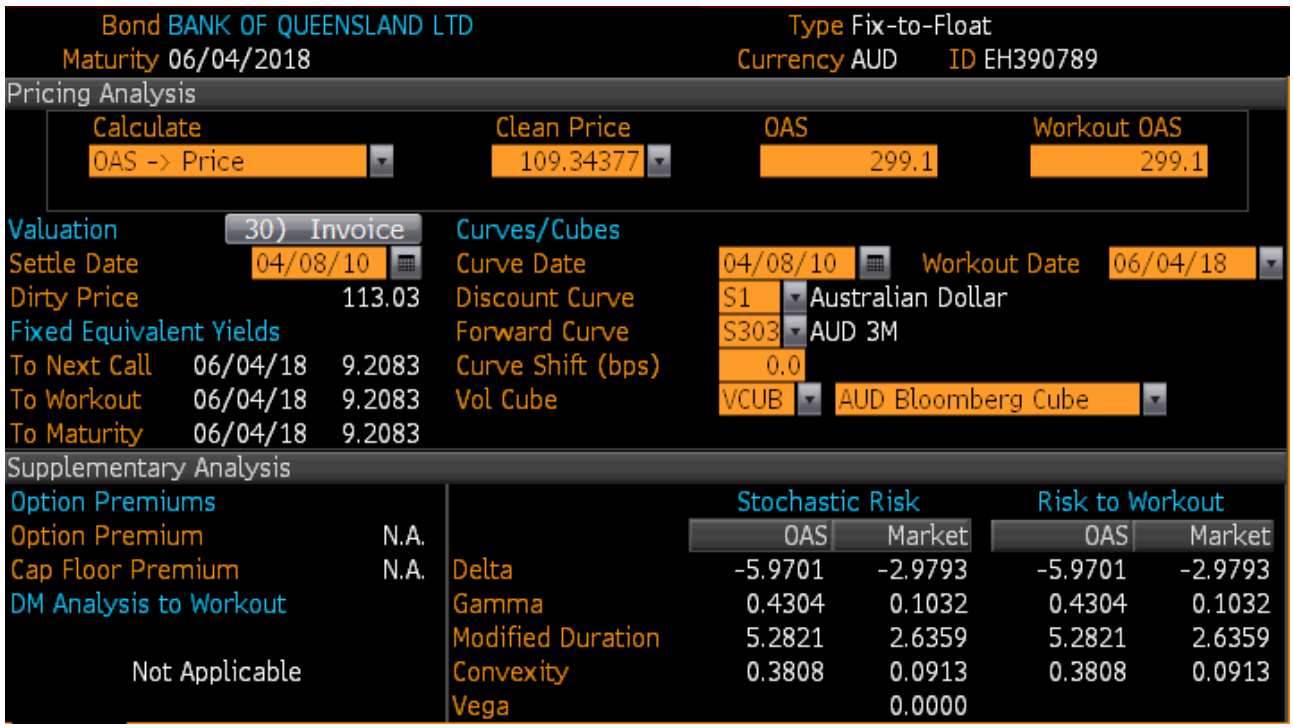
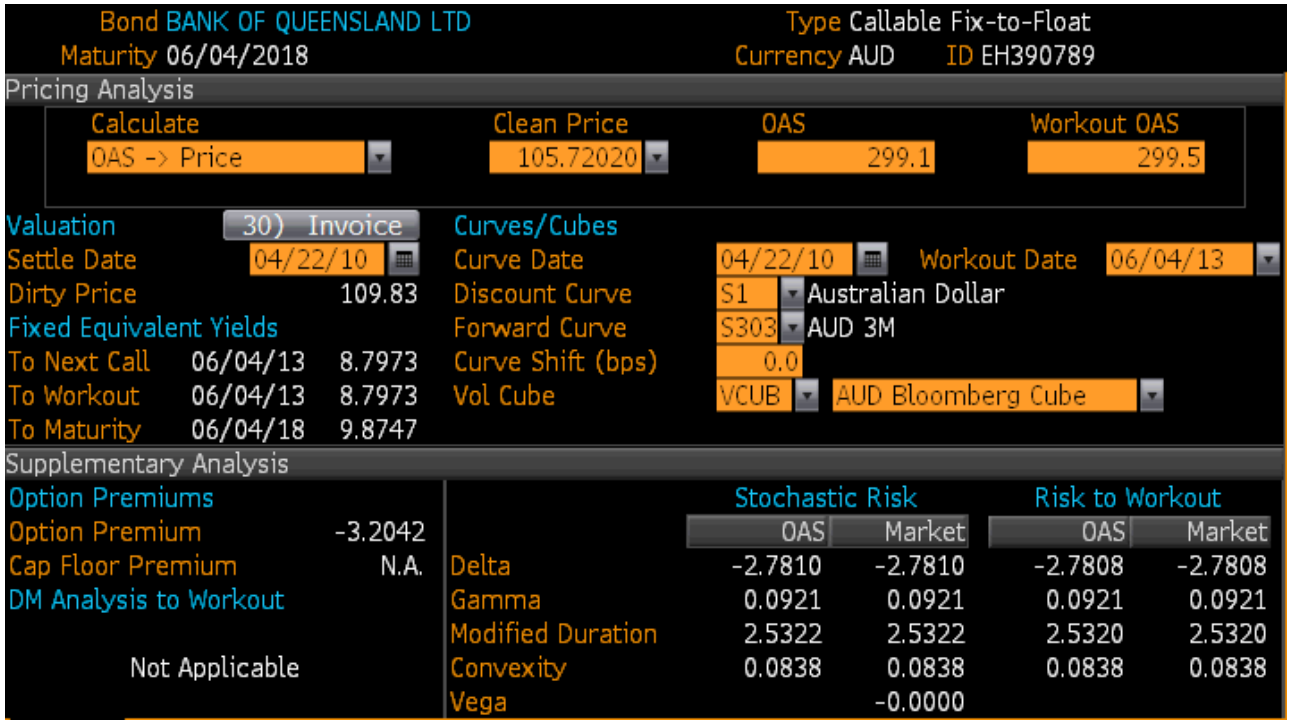


8th April, 2010 – Without Embedded Option



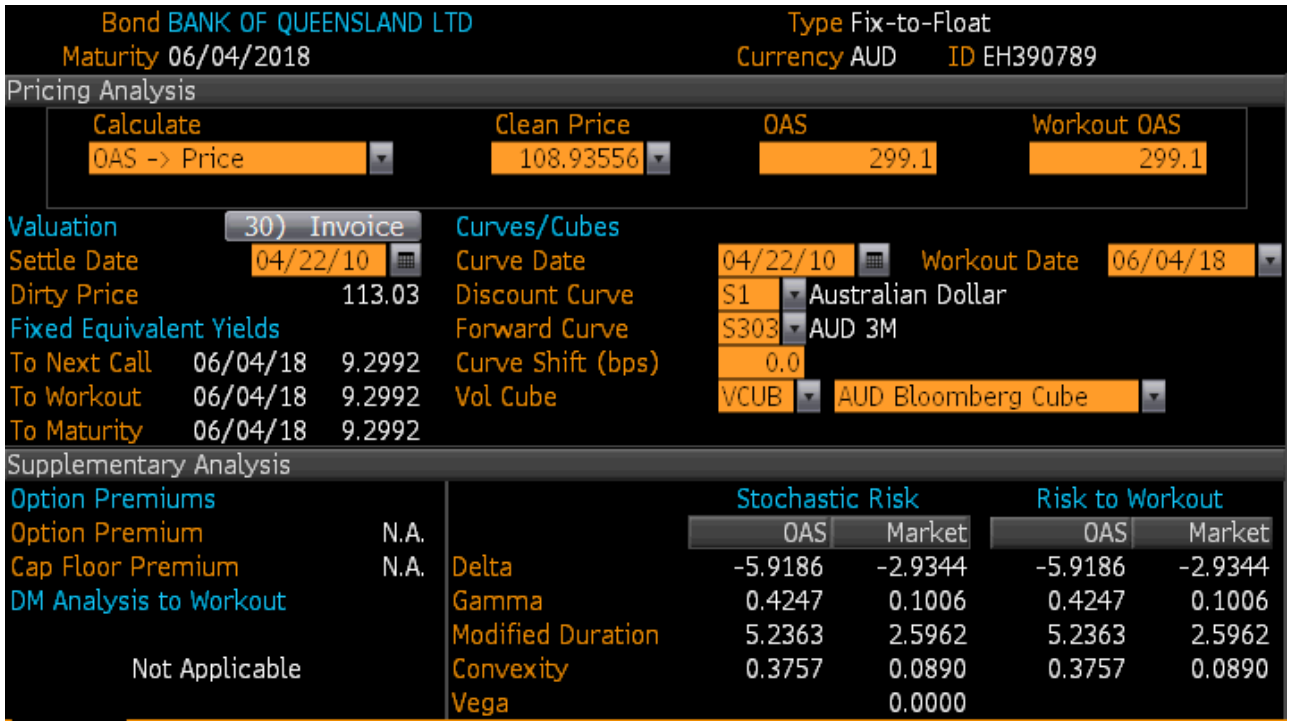
22nd April 2010

With Embedded Option



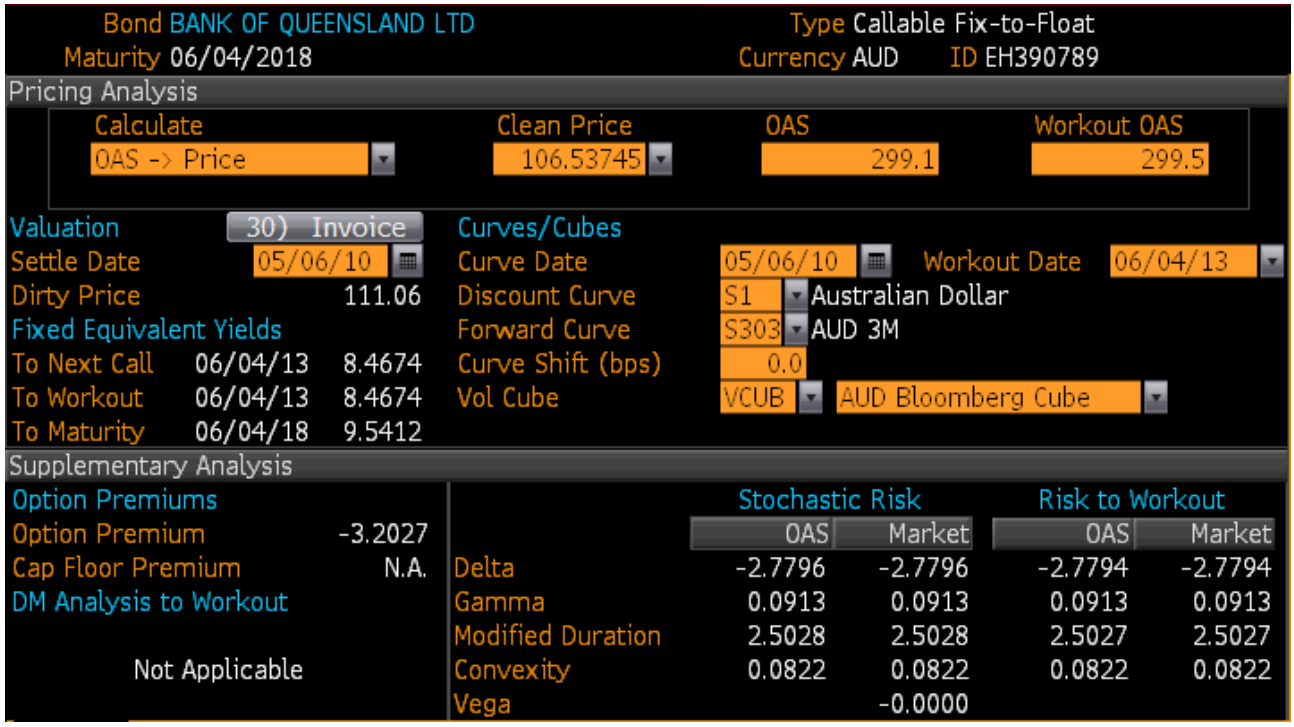
22nd April, 2010

Without Embedded Option



6th May, 2010

With Embedded Option



6th May, 2010

Without Embedded Option