DEBT SECURITIES (FIN5DBS) SAMPLE FINAL EXAMINATION PAPER – SEMESTER 1, 2012

SECTION A

1) Which of the following credit derivative security transactions would be employed to speculate on a decrease in the credit spread associated with a debt issuer:

a) being the protection buyer in a credit default swap relating to the issuer's bonds
b) being the total return payer in a total return swap relating to the issuer's bonds
c) buying a credit spread put option where the underlying is the issuer's bonds with a fixed credit spread
d) buying a credit spread put option where the underlying is the credit spread on the issuer's bonds.

2) The days count convention (days in the month / days in the year) in the US corporate bond market is:

a) actual / actual
b) actual / 360
c) 30 / 360
d) 30 / actual.

3) For a non-zero coupon bond trading at a premium to par value, which of the following statements is correct:

a) the bond's current market value will approximate its par value
b) the bond's yield to maturity will be greater than the coupon rate offered
c) the bond will decrease in value as maturity approaches, all other things being equal
d) the bond's coupon rate will be less than the current yield offered by the bond.

4) Which of the following statements about the relationship between spot rates and forward rates is correct:

a) forward rates are unrelated to equivalent-period spot rates
b) forwards rates will always be greater than equivalent-period spot rates
c) when the underlying term structure of interest rates is rising, spot rates will generally be greater than equivalent-period forward rates
d) when the underlying term structure of interest rates is falling, forward rates will generally be less than equivalent-period spot rates.

5) Which of the following statements relating to the risk exposure from investment in corporate debt securities is correct?

a) All corporate securities are exposed to interest rate risk
b) All corporate debt securities are exposed to downgrade risk
c) All corporate debt securities are exposed to volatility risk
d) Option-free corporate debt securities with a bullet maturity structure are not exposed to prepayment risk.

6) A decrease in the require return (yield) for a bond will:

a) have no influence on the bond's market value, all other things equal
b) increase the bond's value, all other things being equal
c) decrease the bond's value, all other things being equal
d) only influence the bond's value if it has a floating coupon interest rate.

7) The creation of a senior-subordinate tranche structure in an asset-backed securitisation tranche by issuing Class A, Class B and Class C securities is designed to:

a) redistribute prepayment risk only among security-holders
b) redistribute credit risk only among security-holders
c) redistribute reinvestment risk only among security-holders
d) redistribute both prepayment risk and credit risk among security-holders

8) Which of the following is not a form of external credit enhancement for an asset-backed securitisation?

a) Taking out a monoline insurance policy to cover defaults up to 10% of the collateral value
b) Obtaining a letter of credit from the issuer's bank
c) Obtaining a credit rating for the securitisation from Standard and Poor's
d) Overcollateralization of the securitisation by issuing securities with a total value less than the collateral value.

9) Which of the following factors is least likely to influence the underlying prepayment speed associated with a mortgage passthrough security?

a) A decrease in mortgage rates resulting from the central bank lowering official interest rate levels
b) An increase in housing turnover due to higher levels of economic growth
c) The introduction by the banking sector of an early mortgage repayment penalty fee
d) A finance company offering a reduction in financing rates on automobile loans.

10) Which of the following statements relating to the impact of interest rate volatility is correct?

a) Interest rate volatility will only influence bonds with embedded options
b) Greater historical interest rate volatility implies lower expected interest rate risk
c) Higher implied interest rate volatility reduces the value of a put option associated with a bond.
d) Lower interest rate volatility will increase the value of a callable bond.

OVER/

11) A synthetic collateralized debt obligation (CDO) includes the use of which of the following credit derivative securities:

a) a total return swap
b) a credit spread forward contract
c) a basket credit default swap
d) a binary credit default option.

12) A callable bond is said to be overvalued (or rich) if:

a) it is trading at a price above its par value
b) it is trading at a price below its par value
c) its nominal spread is higher than the nominal spread on an equivalent option-free bond issued by the same company
d) its option-adjusted spread (OAS) is less than the OAS for other bonds issued by the same company.

13) Which of the following is an embedded option that is valuable to the bond issuer?

a) A conversion provision allowing the bonds to be converted into the ordinary shares of the issuing company
b) An interest rate floor on a floating rate security
c) An interest rate cap on a floating rate security
d) A put provision.

14) A fund manager states that non-amortizing securities typically have less reinvestment risk and more credit risk than amortising securities. The fund manager's statement *most likely* is:

a) correct with respect to both reinvestment risk and credit risk
b) incorrect with respect to both reinvestment risk and credit risk
c) correct with respect to reinvestment risk, but incorrect with respect to credit risk
d) incorrect with respect to reinvestment risk, but correct with respect to credit risk

15) Which of the following statements relating to the liquidity preference theory explanation of the term structure of interest rates is incorrect?

a) The liquidity preference theory suggests that forward rates are an unbiased estimate of future interest rate expectations
b) The liquidity preference theory suggests that forward rates reflect both interest rate expectations and a premium for interest rate risk
c) The liquidity preference theory predicts that the term structure of interest rates can be both upward-sloping and downward-sloping
d) It is possible for the pure expectations theory and the liquidity preference theory to predict different shapes for the term structure of interest rates.

OVER/

16) Which of the following factors will not influence the intramarket yield spread between bonds issued by two Australian retail companies?

a) the maturity term of the two issues
b) the relative credit risk of the two issues
c) the presence of embedded options with the two issues
d) the current Australian Government benchmark bond yield.

17) An increase in the term to maturity of a bond will:

a) increase the price of the bond, all other things being equal
b) decrease the price of the bond, all other things being equal
c) increase the price of the bond only if the bond's yield also increases
d) decrease the price of the bond only if the bond's yield also increases.

18) Measures of effective duration and modified duration are likely to differ substantially:

a) when bonds are closer to maturity
b) in situations of greater interest rate volatility
c) when convexity adjustment is taken into account
d) when a bond has an embedded option attached.

19) In conducting a credit risk assessment of a company, capacity to pay is likely to be best determined by examining:

a) the company's corporate governance charter
b) covenant requirements associated with the company's mortgage obligations
c) leverage and interest coverage ratios for the company
d) movements in the company's share price in the past year.

20) A corporate debt security pays no coupon interest during the first ten years of its life, and then reverts to paying a high annual coupon rate of 12 per cent per annum, based on quarterly payments, for the remaining ten years of its maturity. This debt security is most likely:

a) a step-up note
b) a discount (zero-coupon) bond
c) a floating rate bond
d) a deferred coupon bond.

OVER/

SECTION B

Question 1)

On May 29th 2012, Tatts Group Limited announced an issue of Tatts Bonds, which are senior, interest-bearing, unsecured debt obligation of Tatts Group Limited, aimed at raising $200 million. Key features relating to the bond issue are as follows:

- The Tatts Bonds will be issued on July 5th 2012 and will mature on July 5th 2019, representing a 7-year maturity term, unless that are redeemed or converted prior to this date.
- The face value is $100 per Tatts Bond.
- The Tatts Bonds offer a floating interest rate which is calculated as the 3-month (90-day) bank bill rate plus a margin of 2.90%. The bank bill rate will be set on the first Business Day of each interest period, and interest will be paid quarterly, in arrears, on the following dates: October 5th, January 5th, April 5th and July 5th.
- Tatts Group Limited does not have any right to redeem the Tatts Bonds prior to the maturity date
- Holders of Tatts Bonds can only request early redemption of the Bonds prior to the maturity date on occurrence of "Change of Control' or 'ASX Delisting' events. Holders of the Tatts Bonds do, however, have a conversion privilege where, on any date after July 5th 2017 (the fifth anniversary of the issue), they can elect to convert each Tatts Bond into 25 ordinary shares of Tatts Group Limited. The Tatts Group Limited share price on May 29th 2012 was $2.59.
- The Tatts Bonds rank equally with all other senior and unsecured creditors of Tatts Group Limited, however, they rank behind any creditors preferred by law and any secured creditors.

Required:

a) The day count convention in the Australian corporate bond market is actual / 365. If the 3-month bank bill rate on the settlement date of the issue was 3.54% and there are 92 days in the first quarter to October 5th 2012, determine the interest payment on one Tatts Bond that will be required to be paid at the end of the first quarter on October 5th 2012.

b) If you purchased Tatts Bonds, outline the nature of the interest rate risk and prepayment (call) risk that you would be exposed to.

c) Suggest reasons why Tatts Group Limited did not include a call provision in the features of the Tatts Bonds, which is a common inclusion in most corporate bond issues.

d) In relation to the convertibility provision provided to Tatts Bond holders as part of the issue, outline the circumstances under which it would be exercisable by Tatts Bond holders. If the Tatts Group Limited share price was $4.50 on November 28th 2017, would you elect to exercise the convertibility provision if you owned Tatts Bonds?

(2 + 3 + 2 + 3 = 10 marks)

OVER/

Question 2)

a) Orica Limited, a listed chemicals and mining explosives manufacturer, announced a structured note issue on May 1st 2008. The bonds were issued with a par (face) value of $1,000, and have a twelve-year maturity. The bonds pay quarterly interest, however, the annual coupon rate paid is linked to the underlying iron ore price (the mining commodity of its main customers) based on the following expression: If the world iron ore price is above $180 per tonne, the notes will pay a fixed coupon rate of 7.40% per annum, otherwise the coupon rate will be 3.80% per annum. At the time of issue, the market required a yield of 6.80% per annum on the structured notes, and the world iron ore price was $220 per tonne and forecast to stay at this level into the foreseeable future.

Required:

i) Based on the above information, determine the market value of one Orica Limited structured note on the issue date.

ii) On May 1st 2010 (two years after issue date), there was a major industrial accident and fire at Orica Limited's main explosive plant at Botany Bay in Sydney. This followed a number of minor incidents at other plant sites in Melbourne. If this caused the market to re-assess its perceived risk of Orica Limited's operations, resulting in an increase in its required return on the company's structured notes to 7.20% per annum, what price should the Orica Limited notes have been trading at on this date?

iii) On May 1st 2012, the People's Republic of China announced a major planned slow-down in development and economic expansion, which would result in a significant reduction in demand for construction materials such as iron ore and copper. Analysts forecast that iron ore prices will fall to $130 per tonne based on this news, and remain at this level or below through to 2020. If the market required return for the notes stayed at 7.20% per annum, what price would you be prepared to pay to purchase the Orica Limited structured notes on May 1st 2012?

b) In August 2011, the Secretary of the US Treasury, Timothy Geithner, announced a modification in the open market operations strategy of the US Treasury involving a bias change toward issuing more long-term US Treasury securities and decreasing its reliance on short-term borrowing.

Required:

Explain how this strategy is likely to impact on long-term bond yields in the US and how it will decrease the likelihood of the US Government defaulting on its debt payment obligations.

(3 + 2 + 2 + 3 = 10 marks)

OVER/

Question 3)
A callable bond has a 7.20% per annum coupon rate, with coupon interest payments made semi-annually, a $100 par value and twelve years to maturity. The bond's current market price is $89.65, which implies that it is currently trading at a bond-equivalent yield to maturity of 8.60%.

Required:

a) Outline whether using effective duration or modified duration is likely to be more appropriate to estimate the interest rate risk for this bond, and the circumstances in which differing interest rate risk measures for this bond are likely to be observed by the two measures.

b) Using the above information, calculate the effective duration of this bond based on a 50 basis point change in yield.

c) Calculate the convexity adjustment for a 120 basis point change in the yield of this bond.

d) Using your answers to parts b) and c), calculate the approximate percentage change in bond price for a decrease in yield of 120 basis points.

(2 + 3 + 3 + 2 = 10 marks)

OVER/

Question 4)
You are evaluating an existing mortgage passthrough security, ROS08, which involves a collateral pool of mortgages on residential property in the Melbourne suburb of Rosanna. The creator of the passthrough security is the Northern Melbourne Building Society, which has a AA credit rating and is also the originator of these mortgages. Information about this mortgage pool is as follows:

Loan	Outstanding Mortgage Balance ($)	Mortgage Rate (%)	Months Remaining
1	$500,000	7.60%	210
2	$350,000	7.40%	192
3	$850,000	8.00%	205
4	$700,000	8.20%	185
5	$600,000	7.70%	190

Each of the mortgages in the collateral pool had a 20-year maturity period originally, and the assumed prepayment speed for the mortgage pool is 130 PSA. To enhance the credit quality of the passthrough security, Northern Melbourne Building Society has provided a guarantee to cover three times the expected losses projected in the offer prospectus of $200,000.

Required:

a) Calculate the weighted average coupon rate (WAC) and the weighted average maturity (WAM) for the ROS08 mortgage passthrough security.

b) The mortgage balances outlined in the above table are as at the beginning of month 40 of the mortgage passthrough security. Scheduled principal payments of $32,000 are expected from the overall mortgage pool in month 40. Based on this information, calculate the conditional prepayment rate (CPR) and the single month mortality rate (SMM) for month 40 for the ROS08 passthrough security, and determine the dollar amount of prepayments expected in month 40.

c) An alternative mortgage-backed security that is being considered as an investment option is FTR05, which is backed by a similar-sized pool of residential mortgages on properties in the inner-city suburb of Fitzroy in Melbourne. This passthrough security is created by Melbourne Property Development Limited. The company has obtained a guarantee for losses incurred on the collateral pool from its bank, which has a AA credit rating, and it has also taken out a monoline insurance policy to provide default cover for 10% ($300,000) of the value of the collateral pool. The FTR05 passthrough security has a passthrough rate of 7.70%, a WAC of 8.25%, a WAM of 200 months, and a forecast average life of 11.40 years based on the observed prepayment speed to date of 145 PSA. Providing reasoning for your answers, explain which of these two passthrough securities (ROS08 and FTR05) has higher credit risk and extension risk, respectively.

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d) If the current market price for the ROS08 passthrough security is 101.40 and the remaining mortgage balances represents a pool factor of 0.80 at the beginning of month 40, what dollar price would you have to pay to purchase a 5% interest in the ROS08 mortgage passthrough security?

(3 + 3 + 3 + 1 = 10 marks)

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SOLUTIONS TO DEBT SECURITIES (FIN5DBS) SEMESTER 1, 2012
SAMPLE FINAL EXAMINATION PAPER

SECTION A – Answers to multiple-choice questions

1) D
2) C
3) C
4) D
5) D
6) B
7) B
8) D
9) D
10) D
11) C
12) D
13) C
14) C
15) A
16) D
17) A
18) D
19) C
20) D

SECTION B

Question 1)
a)
Applicable annual coupon rate = 3.54% + 2.90% = 6.44%
Quarterly coupon interest payment = $100 × 6.44% × 92/365 = $1.6232

b)
Investors in the Tatts Bonds would face minimal interest rate risk due to the floating interest rate determination setting, with changes in applicable coupon interest rates (on a quarterly basis) offsetting any bond price changes resulting from underlying market interest rate movements. There will likely be some interest rate risk effects for Tatts Bond prices if market interest rates change in between interest rate resetting dates, with greater exposure the closer the time to the previous floating rate reset date. The Tatts Bonds do not expose investors to prepayment risk because they do not include a call (redemption) provision.

c)
Possible reasons for not including a call provision are the relatively short maturity term for the issue of seven years, the likelihood that Tatts Group Limited wanted use of the funds raised for the entire period, and the potential expectation that the bonds would be converted to ordinary shares of Tatts Group Limited and redemption before or at expiry date would not be required.

d)
It would be in the interests of Tatts Bond holders to convert the bonds to ordinary shares of Tatts Group Limited if the value of the shares obtained exceeds the present value of the cash flows to be received from the bonds. Based on the conversion ratio of 25, the share price of Tatts Group Limited would have to be $4.00 for the bonds to have a market value greater than the bond's par value (not considering interest future payments from the bonds and dividend payments from the shares). If the Tatts Group Limited share price was $4.50 on November 28th 2017, this is above the conversion value of the bonds and you would likely elect to convert the bonds in these circumstances.

Question 2)
a)i)
Number of quarterly periods = 48
Quarterly yield = 6.80% / 4 = 1.70%
Quarterly interest payment = 7.40% / 4 × $1,000 = $18.50
Principal payment = $1,000
Note value = $1,048.9494

a)ii)
Number of quarterly period = 40
Quarterly yield = 7.20% / 4 = 1.80%
Quarterly interest payment = $18.50
Principal payment = $1,000
Note value = $1,014.1700

a)iii)
Number of quarterly periods = 32
Quarterly yield = 1.80%
Quarterly interest payment = 3.80% / 4 × $1,000 = $9.50
Principal payment = $1,000
Note value = $795.5973

b)
Increasing the supply of longer-term Treasury securities will most likely require the offering of a higher yield to encourage investors to buy longer-term securities. This will have the effect of increasing long-term bond yields and, consequently, lowering long-term bond prices.

By reducing the relative reliance on shorter-term funding, this will reduce the required payments on maturing securities and/or the amount of near-term debt that the US Treasury has to roll-over, lowering the likelihood of them defaulting on shorter-term debt payment requirements.

Question 3)
a)
Effective duration should be the preferred measure for this bond because it has an embedded option which may impact on cash flows at different yield levels. In this case, however, effective and modified duration will provide identical measures of interest rate risk as the call option is currently out-of-the-money. Once the option

becomes callable (when the yield < coupon rate), differing values will likely be obtained for effective and modified duration.

b)
V_- = $93.17
V_+ = $86.30
Effective duration = 7.6631

c)
Value for C = 37.9253
Convexity adjustment = 0.5461%

d)
Approximate percentage bond price based on Duration = 9.1957%
Approximately percentage bond price change including convexity adjustment = 9.7418%

Question 4)
a)
WAC = 7.8500%
WAM = 196.6504 (197 months rounded up)

b)
CPR for month 40 = 0.078 (7.80%)
SMM for month 40 = 0.00674465 (0.674465%)
Prepayment in month 40 = $20,018.1212

c)
In terms of credit risk, based on the weak-link principle associated with credit enhancement mechanisms, both of these mortgage passthrough securities are expected to receive a maximum credit rating of AA. This suggests that they have similar underlying credit risk. To separate them, we can look at the loss coverage that is being provided by both passthrough securities. Given that the underlying collateral pools are similar in size, ROS08 is providing loss coverage of $600,000 compared to FTR05 where the sponsors are only obtaining loss coverage of approximately $300,000 through the monocline insurance policy. Thus, mortgage passthrough FTR05 would appear to have higher credit risk.

In terms of extension risk, mortgage passthrough FTR05 would also appear to have greater extension risk based on its longer WAM and higher underlying prepayment speed relative to mortgage passthrough ROS08. Note that it would also be particularly relevant to compared the average lives of the two passthrough securities, as this adjusts for prepayment speed and provides a better measure of the likely outstanding life of the securities.

d)
Dollar purchase price = $121,680