Financial Accounting
Recitation 7

MIT Sloan School of Management

Finance at MIT
Where ingenuity drives results

Agenda

- Bonds and long-term debt
- Leases

Bonds – Terminology

Par Value	Stated or face value of the bond; the amount due at maturity (usually $1,000)
Maturity	The date the firm must repay the investors their principal
Coupon Rate	The interest rate stated on the face of the bond. The coupon rate is used to determine the periodic cash payments (if any)

Bonds – Terminology

Three interest rates are relevant to bond accounting:

1. **Coupon rate** – the interest rate stated in the bond. The periodic cash payments made to investors will be the coupon rate times the par value of the bond. Coupon payments are typically semi-annual.

2. **Market interest rate (at issuance)** – the rate that determines the interest expense and the book value of the liability at issuance. (Also known as the effective interest rate.) Note: this rate is fixed at the time of issuance.

3. **Market interest rate (current)** – the rate that determines the current market value of the bond. This rate is based upon market conditions and risk characteristics of the borrower. Note: this rate fluctuates over time.

Accounting for Bonds

Bonds issued at par (see class video)

- Market rate *at issuance* (MR) = coupon rate (CR)

Zero-coupon bonds (see class video)

- No coupon payment
- Payment only due at maturity

Bonds issued at a discount/premium (this recitation)

- Discount: market rate *at issuance* > coupon rate
- Premium: market rate *at issuance* < coupon rate

Bonds at Discount (MR > CR)

Face Value = 10,000
Coupon Rate = 6%
Market Rate = 8%
Maturity = 3 years

t	Actual Cash flow	PV of Cash flow	
1	600	$\frac{600}{1.08^1}$	= 555
2	600	$\frac{600}{1.08^2}$	= 514
3	10,600	$\frac{10{,}600}{1.08^3}$	= 8,415
			9,484

Cash-flows can be seen as:

- $600 annuity for 3 years, at 8% market rate
- $10,000 single sum in 3 years, at 8% market rate

Math:

- Annuity: $2.57710\ (from\ table) * 600 = 1{,}546.26$
- Single sum: $0.79383\ (from\ table) * 10{,}000 = 7{,}938.30$
- **Total NPV of cash-flows:** $\mathbf{9{,}484}$

	Cash (A)	Bond Payable (L)	-Bond Discount (CL)	R/E (E)	*Net Bond Payable*	*Discount Balance*
Issuance	9,484	10,000	516		*9,484*	*516*
Year 1	-600		-159	-759 int.exp.	*9,643*	*357*
Year 2	-600		-171	-771 int.exp.	*9,814*	*186*
Year 3	-600		-186	-786 int.exp.	*10,000*	*0*
	-10,000	-10,000	0			

*8%

Bonds at Premium (MR < CR)

Face Value = 10,000
Coupon Rate = 8%
Market Rate = 6%
Maturity = 3 years

t	Actual Cash flow	PV of Cash flow	
1	800	$\frac{800}{1.06^1}$	= 755
2	800	$\frac{800}{1.06^2}$	= 712
3	10,800	$\frac{10{,}800}{1.06^3}$	= 9,068
			10,535

	Cash (A)	Bond Payable (L)	+Bond Premium (L)	R/E	*Net Bond Payable*	*Premium Balance*
Issuance	10,535	10,000	535		*10,535*	*535*
Year 1	-800		-168	-632 int.exp.	*10,367*	*367*
Year 2	-800		-178	-622 int.exp.	*10,189*	*189*
Year 3	-800		-189	-611 int.exp.	*10,000*	*0*
	-10,000	-10,000	0			

*6%

Early Retirement of Debt

- Market value of debt can differ from book value
  - Firm's economic conditions (credit quality)
  - Macroeconomic conditions (interest rates)

- Market value > book value results in a loss
- Market value < book value results in a gain

Example: we have a zero-coupon bond on our books with the following balances:

Bond Payable (L)	**-Bond Discount (CL)**	
11,500	1,500	(net book value = 10,000)

We repurchase the bond at the market value of 8,500
(i.e. market rate increased, value of debt decreased)

Cash (A)	**Bond Payable (L)**	**-Bond Discount (CL)**	**R/E (E)**	
- 8,500	-11,500	-1,500	1,500	Gain

Question 1: Transocean Ltd.

Note 11 – Debt

Debt, net of unamortized discounts and premiums, was comprised of the following (in millions)

	December 31, 2010	December 31, 2009
7.375% Senior Notes due April 2018	$247	$247
7.45% Notes due April 2027	96	96
8% Debentures due April 2027	57	57

7.375% Senior Notes—In March 2002, we completed an exchange offer and consent solicitation for TODCO's 7.375% Senior Notes (the "Exchange Offer"). As a result of the Exchange Offer, we issued our 7.375% Senior Notes (the 7.375% Senior Notes). At December 31, 2010, $246 million principal amount of the 7.375% Senior Notes were outstanding.

7.45% Notes and 8% Debentures—In April 1997, a predecessor of Transocean Inc. issued $100 million aggregate principal amount of 7.45% Notes due April 2027 (the "7.45% Notes") and $200 million aggregate principal amount of 8% Debentures due April 2027 (the "8% Debentures"). At December 31, 2010, $100 million and $57 million principal amount of the 7.45% Notes and the 8% Debentures, respectively, were outstanding.

Question 1: Transocean Ltd.

Part A: As of December 31, 2010, has Transocean redeemed any of the 7.45% Notes? If yes, how much?

Answer	No, since the principal amount on December 31, 2010 is the same as the issuance amount ($100 million)

7.45% Notes and 8% Debentures—In April 1997, a predecessor of Transocean Inc. issued $100 million aggregate principal amount of 7.45% Notes due April 2027 (the "7.45% Notes") and $200 million aggregate principal amount of 8% Debentures due April 2027 (the "8% Debentures"). At December 31, 2010, $100 million and $57 million principal amount of the 7.45% Notes and the 8% Debentures, respectively, were outstanding.

Question 1: Transocean Ltd.

Part B: As of December 31, 2010, how much is the discount on the 7.45% notes? Is the yearly amortization of the discount likely to be a material amount? (Hint: Note 11 reports annual debt totals net of unamortized discounts.)

Answer	The discount on the 7.45% notes is $4M (=$100M principal - $96M net balance). The yearly amortization is unlikely to be material. The rounded value of the net obligation didn't change, indicating that the change was less than $1M.

Note 11 – Debt

Debt, net of unamortized discounts and premiums, was comprised of the following (in millions)

	December 31, 2010	December 31, 2009
7.375% Senior Notes due April 2018	$247	$247
7.45% Notes due April 2027	96	96
8% Debentures due April 2027	57	57

7.45% Notes and 8% Debentures—In April 1997, a predecessor of Transocean Inc. issued $100 million aggregate principal amount of 7.45% Notes due April 2027 (the "7.45% Notes") and $200 million aggregate principal amount of 8% Debentures due April 2027 (the "8% Debentures"). At December 31, 2010, $100 million and $57 million principal amount of the 7.45% Notes and the 8% Debentures, respectively, were outstanding.

Question 1: Transocean Ltd.

Part C: Were the 7.375% senior notes issued at a premium, at a discount, or at par?

Answer	They were issued at a premium. The balance of the loan, ~~including~~ net the unamortized premium, is $247M, which is greater than the principal amount ($246M).

Note 11 – Debt

Debt, net of unamortized discounts and premiums, was comprised of the following (in millions)

	December 31, 2010	December 31, 2009
7.375% Senior Notes due April 2018	$247	$247
7.45% Notes due April 2027	96	96
8% Debentures due April 2027	57	57

7.375% Senior Notes—In March 2002, we completed an exchange offer and consent solicitation for TODCO's 7.375% Senior Notes (the "Exchange Offer"). As a result of the Exchange Offer, we issued our 7.375% Senior Notes (the 7.375% Senior Notes). At December 31, 2010, $246 million principal amount of the 7.375% Senior Notes were outstanding.

Question 2: Dollar General

Part A: Using the BSE, show the transaction for Dollar General's issuance of 11.875% senior subordinated notes (the "Senior Subordinated Notes") in 2007. For this question, ignore the issuance of the "Senior Notes" and only focus on the "Senior Subordinated Notes"

Footnotes (page 9):

Also on July 6, 2007, the Company issued $725 million aggregate principal amount of 11.875% senior subordinated notes due 2017 (the "Senior Subordinated Notes"). The Company received net proceeds from the issuance of the Senior Subordinated Notes of $718 million after the deduction of issuance costs of $7.0 million.

Assets		= Liabilities	+ Shareholders Equity

issuance costs created a funding benefit for the issuer that will last for a number of years, so the expense should be charged over the life of the bonds

Cash (A)	Deferred Issuance Cost (A)	Bonds Payable (L)
$718M	$7M	$725M

Question 2: Dollar General

For questions (b) and (c), assume that on January 28, 2011 Dollar General issues a zero coupon bond for cash. The bond has a face amount of $800,000 thousand, with a 20 year maturity and a 6% interest rate (there is one lump sum payment of $800,000 thousand in 20 years).

Part B: Use the BSE to identify the transactions Dollar General records to reflect the issuance of the zero coupon bond.

Assets	**=**	**Liabilities**		**+**	**Shareholders Equity**
Cash (A)		**Bonds Payable (L)**	**-Bond Discount (CL)**		
$249,444		$800,000	$550,556		

$$\text{where } 249{,}444 = \frac{800{,}000}{(1+0.06)^{20}}$$

Question 2: Dollar General

Part C: Use the BSE to record the annual interest expense related to the zero-coupon bond issued in question 2 (B) for the fiscal year ending February 3, 2012 and 2013.

	Assets	**=**	**Liabilities**		**+**	**Shareholders Equity**
	Cash (A)		**Bonds Payable (L)**	**-Bond Discount (CL)**		**R/E (E)**
2011:	$249,444		$800,000	$550,556		
2012:				- $14,967		- $14,967 (Int. Exp.)
2013:				- $15,864		- $15,864 (Int. Exp.)

$$Interest\ Expense_{2012} = NBP_{2012} * Interest\ rate = (800{,}000\text{-}550{,}556) * 6\% = 14{,}967$$

$$Interest\ Expense_{2013} = NBP_{2013} * Interest\ rate = (800{,}000\text{-}550{,}556\text{+}14{,}967) * 6\% = 15{,}864$$

Leases

The **Lessee** “rents” from the **Lessor**

- We are interested in accounting for Lessee’s side of the transaction

Two types of leases: Finance and Operating Leases

- There are established rules for determining between the two (not on the exam)

The accounting for the two leases is different

Finance Leases

Same accounting rules as before

- Terminology changed from “capital lease” to “finance lease”

Example: Suppose the lease consists of 10 annual payments of $25K with an interest rate of 5%

At the time of acquisition, how much do we recognize as assets/liabilities?

Finance Leases: At time of Inception

Example: Suppose the lease consists of 10 annual payments of $25K with an interest rate of 5%

	Year 1	2	3	4	5	6	7	8	9	10
Payment	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000
Discount rate	1.05	1.1025	1.157625	1.215506	1.276282	1.340096	1.4071	1.477455	1.551328	1.628895
PV	23809.52	22675.74	21595.94	20567.56	19588.15	18655.38	17767.03	16920.98	16115.22	15347.83
Sum of PV	193043									

Alternatively, look up PV Annuity table

- $25{,}000 \times 7.7217 = 193K$ (rounded)

n / i	1%	2%	3%	4%	5%
1	0.9901	0.9804	0.9709	0.9615	0.9524
2	1.9704	1.9416	1.9135	1.8861	1.8594
3	2.9410	2.8839	2.8286	2.7751	2.7232
4	3.9020	3.8077	3.7171	3.6299	3.5460
5	4.8534	4.7135	4.5797	4.4518	4.3295
6	5.7955	5.6014	5.4172	5.2421	5.0757
7	6.7282	6.4720	6.2303	6.0021	5.7864
8	7.6517	7.3255	7.0197	6.7327	6.4632
9	8.5660	8.1622	7.7861	7.4353	7.1078
10	9.4713	8.9826	8.5302	8.1109	7.7217

	Assets			=	L	+	SE	R/E Description
	Cash	+	Lease Assets	=	Lease obligations	+	R/E	
Inception:			193K		193K			

Finance Leases: Accounting in First Year

- In the following periods, need to book two things:
  - (i) amortization of the lease asset
  - (ii) lease payment covers interest expense and repays part of obligation
- Amortization expense
  - $193K/10 = 19.3K$
- Interest expense = $Remaining\ Lease\ Obligation \times Interest\ rate$
  - $193K \times 0.05 = 9.65\ K$
- "Repayment of Lease Obligation" = $Lease\ payment\ - Interest\ Expense$
  - $25K\ - 9.65K = 15.35K$

	Assets				=	L	+	SE	R/E Description
	Cash	+	Lease Assets	-Acc. Amort.	=	Lease obligations	+	R/E	
Inception:			193K			193K			
Yr 1:				19.3K				-19.3K	Amortization Expense
	-25K					-15.35K		-9.65K	Interest Expense

Finance Leases: Accounting in Second Year

- Amortization expense = 19.3K
- Interest expense = $Remaining\ Lease\ Obligation \times Interest\ rate$
  - $(193K - 15.35K) \times 0.05 = 8.88\ K$
- "Repayment of Lease Obligation" =$Lease\ payment\ - Interest\ Expense$
- $25K\ - 8.88K = 16.12K$

	Assets				=	L	+	SE	R/E Description
	Cash	+	Lease Assets	-Acc. Amort.	=	Lease obligations	+	R/E	
Inception:			193K			193K			
Yr 1:				19.3K				-19.3K	Amortization Expense
	-25K					-15.35K		-9.65K	Interest Expense
Yr 2:				19.3K				-19.3K	Amortization Expense
	-25K					-16.12K		-8.88K	Interest Expense

Finance Leases: After Second Year

- Intuition: We pay fixed amount every year ($25,000)
  - Part of the payment is interest expense (calculated as % of remaining obligation)
  - Rest of the payment is paying back the lease obligation
- Remember:
  - Interest is only paid on the **remaining lease obligation**
  - As lease obligation decreases, interest expense decreases and larger fraction of payment goes towards paying down the principal

Payment #	Payment	Interest Exp	Principal	Lease Obligation
0				$193,043
1	$25,000	$9,652	$15,348	$177,696
2	$25,000	$8,885	$16,115	$161,580
3	$25,000	$8,079	$16,921	$144,659
4	$25,000	$7,233	$17,767	$126,892
5	$25,000	$6,345	$18,655	$108,237
6	$25,000	$5,412	$19,588	$88,649
7	$25,000	$4,432	$20,568	$68,081
8	$25,000	$3,404	$21,596	$46,485
9	$25,000	$2,324	$22,676	$23,810
10	$25,000	$1,190	$23,810	($0)

Operating Leases

At inception: Record assets and liability (same as for finance lease)

Thereafter: Two things change relative to finance lease:

- (Straight-line) Lease expense is same each year: $(\frac{\Sigma Lease\ Payments}{Number\ of\ Periods})$
- Asset value: Instead of "amortizing" the lease asset, we reduce the value of the asset by the same amount we reduce (i.e., pay off) the liability.

Let's return to the example of a lease that is 10 annual payments of $25K with interest rate of 5%, but suppose it is classified as OPERATING, not financing.

	Assets			=	L	+	SE	R/E Description
	Cash	+	Lease Assets	=	Lease obligations	+	R/E	
Inception:			193K		193K			

Operating Leases: Accounting in First Year

No amortization expense

Lease expense = $\frac{\Sigma Lease\ Payments}{Number\ of\ Periods} = 25K$

"Interest expense" = $Remaining\ Lease\ Obligation \times Interest\ Rate$

- $193K \times 0.05 = 9.65K$
- Note: There is no "interest expense" for an operating lease

Amount paid back = Straight-line Expense – "Interest Expense"

- 25K – 9.65K = 15.35K
- This amount reduces the lease obligations
- We also reduce lease assets by the same amount ("amortization expense")

	Assets			=	L	+	SE	R/E Description
	Cash	+	Lease Assets	=	Lease obligation	+	R/E	
Inception:			193K		193K			
Yr 1:	-25K		-15.35K		-15.35K		-25K	Lease expense

Operating Leases: Accounting in Second Year

Lease expense = $\frac{\Sigma Lease\ Payments}{Number\ of\ Periods} = 25K$

"Interest expense" = $Remaining\ Lease\ Obligation \times Interest\ Rate$

- $(193K - 15.35K) \times 0.05 = 8.88K$

Amount paid back = Straight-line Expense – "Interest Expense"

- 25K – 8.88K = 16.12K
- This amount is going to reduce lease obligations
- We also reduce lease assets by the same amount ("amortization expense")

	Assets			=	L	+	SE	R/E Description
	Cash	+	Lease Assets	=	Lease obligations	+	R/E	
Inception:			193K		193K			
Yr 1:	-25K		-15.35K		-15.35K		-25K	Lease expense
Yr 2:	-25K		-16.12K		-16.12K		-25K	Lease expense

Question 3: Capitalizing off-balance-sheet items

The information is provided by Zoltan Corp. Off balance sheet obligations as of December 31, 2011 are as follows:

2012	$	600,000
2013		600,000
2014		600,000
2015		600,000
2016		600,000
Thereafter		2,400,000
Total minimum payments	$	5,400,000

FOR THIS QUESTION, ASSUME A 0% TAX RATE.

Describe how Zoltan's assets and liabilities on December 31, 2011 would change if off balance sheet obligations are capitalized. Use the BSE to record this transaction. **For this question, assume that the discount rate is 6% and assume that Zoltan pays the payments at the end of the fiscal year. Also, assume that Zoltan makes equal payments over a nine-year period.**

Question 3: Capitalizing off-balance-sheet items

- Off balance sheet obligations are $600,000/year
- Discount rate @ 6% → discount each year's $600K cash flow for 9 years
- Sum up the discounted values → $4.081 million

Year	Amount	Calculation	Discounted value
2012	600,000.0	600K/(1.06)	566,037.7
2013	600,000.0	600K/(1.06)^2	533,997.9
2014	600,000.0	600K/(1.06)^3	503,771.6
2015	600,000.0	600K/(1.06)^4	475,256.2
2016	600,000.0	600K/(1.06)^5	448,354.9
2017	600,000.0	600K/(1.06)^6	422,976.3
2018	600,000.0	600K/(1.06)^7	399,034.3
2019	600,000.0	600K/(1.06)^8	376,447.4
2020	600,000.0	600K/(1.06)^9	355,139.1
	Total		4,081,015.4

Balance sheet equation:

Assets			=	L
Cash	+	Assets	=	Liabilities
		$4.081 million		$4.081 million