Agenda – Long-Term Debt

- Extend our understanding of valuation methods beyond simple present value calculations.
- Understand the terminology of long-term debt
  - Bonds – coupon and zero-coupon bonds
  - At Par vs. Discount vs. Premium
    - Market interest rate versus coupon rate
    - Mortgages – Interest plus Principal paid each period
- Practice bookkeeping for debt issuance, interest accruals, periodic payments, and debt retirement.
- Understand how long-term debt affects financial statements over time.

Bonds

- Bonds
  - Periodic interest payments and face value due at maturity
- Face value (amount)
  - (Principal) Amount due at maturity
- Interest payments
  - Coupon rate times the face value of debt
  - Coupon rate is the interest rate stated in the note. It’s used to calculate interest payments
- Market rate of interest
  - The rate of interest demanded in the market place given the risk characteristics of a bond
  - Can be higher or lower than the coupon rate
**Bonds**

- Consider a loan with
  - principal of $10,000
  - initiated on 1/1/01
  - The market interest rate is 6%
  - Final payment is to be made at the end of the third year, i.e., on 12/31/03.
- What annual payments are required under the following three alternatives?
  - Annual interest payment at the end of each year and repayment of principal at the end of the third year (typical bond terms).
  - A single payment (of principal and interest) at the end of year 3 (Zero-Coupon bond).
  - Three equal payments at the end of each year (mortgage / new car loan terms).

**Bonds - alternative payment streams**

<table>
<thead>
<tr>
<th></th>
<th>Coupon</th>
<th>Zero</th>
<th>Mortgage</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of Year 1</td>
<td>Int</td>
<td>0</td>
<td>Int + P</td>
</tr>
<tr>
<td>End of Year 2</td>
<td>Int</td>
<td>0</td>
<td>Int + P</td>
</tr>
<tr>
<td>End of Year 3</td>
<td>Int + P</td>
<td>Int + P</td>
<td>Int + P</td>
</tr>
</tbody>
</table>

**Accounting for a Bond issued at par**

*Coupon Rate 6% = Market Rate 6%*

- At the time of the bond issue
  - Dr Cash 10,000
  - Cr Bond Payable 10,000
- Periodically thereafter
  - Cash interest payments = Face Value x Coupon rate
  - Bond payable at the present value of cash flows, i.e., the present value of interest and principal
  - Interest expense = Bond payable x market interest rate
  - Difference between interest expense and cash interest payment is added to Bond Payable
- At maturity
  - Pay interest and entire principal balance
Accounting for a Bond issued at par
Coupon Rate 6% = Market Rate 6%

What is the present value of the bond?

Payment stream
- Three annual coupon payments of $600 each
- Principal payment of $10,000 at the end of three years

Present value
- PV of ordinary annuity, n = 3, r = 6%, Table 4
- $600 x 2.67301 = $1603.81
- PV of $10,000, n = 3, r = 6%, Table 2
- $10,000 x 0.83962 = $8396.20
- $1603.81 + $8396.20 = $10,000

End of year 1
- Interest expense = $10,000 x 6%
- Coupon payment = $100,000 x 6%
- Dr Interest expense 600
- Cr Cash 600

End of year 2
- Dr Interest expense 600
- Cr Cash 600

End of year 3
- Dr Interest expense 600
- Dr Bond Payable 10,000
- Cr Cash 10,000

Cash = Bond Payable + Ret Erngs

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash</th>
<th>Bond Payable</th>
<th>Ret Erngs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>(600)</td>
<td></td>
<td>(600)</td>
</tr>
<tr>
<td>2002</td>
<td>(600)</td>
<td></td>
<td>(600)</td>
</tr>
<tr>
<td>2003</td>
<td>(10,000)</td>
<td></td>
<td>(10,000)</td>
</tr>
</tbody>
</table>
Accounting for a Zero-Coupon Bond

- The zero-coupon bond pays $10,000 at the end of three years.
- How much will it sell for? That is, how much cash proceed will the firm receive at the time of issuing the zero-coupon bond?
  - What is the present value of such a bond at the time of issue?
  - PV of $10,000, n = 3, r = 6%, Table 2
  - $10,000 x 0.83962 = $8396.20

Accounting for a Zero-Coupon Bond

- At the time of the bond issue
  - Dr Cash 8,396.20
  - Dr Discount on bonds payable 1,603.80
  - Cr Bond Payable 10,000.00
- Balance sheet presentation
  - Bond payable, gross $10,000.00
  - Less Discount ($1603.80)
  - Net Bond Payable $8396.20

Zero-Coupon Bond

- Over time, the discount is reduced so that at maturity the net bond payable equals the face value of the bonds, $10,000
- Periodically after issuance
  - Cash interest payments = 0
  - Interest expense = Bond payable x market interest rate
  - Difference between interest expense and cash interest payment reduces Discount Account
- At maturity
  - Pay interest and entire principal balance
  - Remove Bonds Payable
Zero-Coupon Bond

End of year 1
- Interest expense = $8,396.2 x 6% = 503.77
- No cash interest payment, so add the interest to Bond Payable
- Dr Interest expense 503.77
- Cr Discount 503.77
- Balance in Discount Account = $(1603.80 – 503.77) = $ 1100.03
- Net Bonds Payable = $8396.20 + 503.77 = $8899.97
- OR
- Net Bonds Payable = $10,000 – (1100.03) = $8899.97

Zero-Coupon Bond

End of year 2
- Interest expense = $8,899.97 x 6% = 534.00
- No cash interest payment, so add the interest to Bond Payable
- Dr Interest expense 534.00
- Cr Discount 534.00
- Balance in Discount Account = $(1100.03 – 534.00) = $ 566.03
- Net Bonds Payable = $8899.97 + 534.00 = $9433.97
- OR
- Net Bonds Payable = $10,000 – 566.03 = $9433.97

Zero-Coupon Bond

End of year 3
- Interest expense = $9433.97 x 6% = 566.03
- No cash interest payment, so add the interest to Bond Payable
- Dr Interest expense 566.03
- Cr Discount 566.03
- Balance in Discount Account = 0
- Net Bonds Payable = $9433.97 + 566.04 = $10,000
- OR
- Net Bonds Payable = $10,000 – 0 = $10,000
- Pay off the bond at maturity
- Dr Bond Payable 10,000
- Cr Cash 10,000
### Accounting for a Zero-Coupon Bond

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash</th>
<th>Bond Payable - Discount</th>
<th>NBP</th>
<th>RE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$0</td>
<td>(10,000 - 1,100.03)</td>
<td>8999.97</td>
<td>(503.77)</td>
</tr>
<tr>
<td>2002</td>
<td>$0</td>
<td>(10,000 - 566.03)</td>
<td>9433.97</td>
<td>(534)</td>
</tr>
<tr>
<td>2003</td>
<td>$0</td>
<td>(10,000 - 0)</td>
<td>10,000</td>
<td>(566.03)</td>
</tr>
</tbody>
</table>

Pay off the bond ($10,000)

### Accounting for a Mortgage

- In a mortgage, you make equal payments each period until maturity.
- Each payment represents interest and some principal repayment.
- PV of an ordinary annuity of three payments = $10,000
  - N = 3, r = 6%, Table 4
  - $10,000 = PVOA (n= 3, r = 6%) x Mortgage Payment
  - Mortgage Payment = $10,000/2.67301 = $3741.10

### Accounting for a Bond issued at par

**Coupon Rate 6% = Market Rate 6%**

- At the time of the mortgage
  - Dr Cash 10,000
  - Cr Mortgage Payable 10,000
- Periodically thereafter until maturity
  - Cash mortgage payment equals
    - Interest expense = Outstanding mortgage balance x Market interest rate
    - The excess of mortgage payment over interest expense reduces the Mortgage Principal balance
**Accounting for a Mortgage**

Cash = Mortgage Payable

Cash = Mortgage + Ret Earnings

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash</th>
<th>Mortgage</th>
<th>Ret Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>(3,741)</td>
<td>(3,141)</td>
<td>(600)</td>
</tr>
<tr>
<td></td>
<td>(3,741)</td>
<td>(3,329)</td>
<td>(412)</td>
</tr>
<tr>
<td></td>
<td>(3,741)</td>
<td>(3,530)</td>
<td>(211)</td>
</tr>
</tbody>
</table>

**Bond issued at a Discount**

Coupon rate 6% < Market rate at issuance 8%

- Cash flows to the bondholder
  - Interest payments = Coupon rate x Face Value = $600
  - Principal at maturity = $10,000

- Proceeds from bond issue
  - PV of cash flows discounted at the MARKET interest rate of 8%
    - PVOA (n = 3, r = 8%) x $600 = 2.57710 x 600 = $1546.26
    - PV of (10,000, n = 3, r = 8%) = 0.79383 x 10,000 = $7938.30
    - Total = $9484.56

- Bond Payable $10,000.00
- Less Discount (515.44)
- Net Bond Payable $9,484.56

**At the end of first year**

- Interest expense
  - Net Bond Payable x 8%
  - $9484.56 x 8% = $758.77

Dr Interest expense 758.77
Cr Cash 600.00
Cr Discount on Bond Payable 158.77

Net Bond Payable = $9484.56 + 158.77 = $9643.33
Bond issued at a Discount
Coupon rate 6% < Market rate at issuance 8%

\[
\text{Cash} = \left[ \text{Bond Payable} - \text{Discount} \right] = \text{NBP}
\]

\[
\begin{align*}
\text{Issue} & \quad 9,485 \quad \left[ \text{10,000} - 515 \right] = 9,485 \\
\text{Cash} & \quad \left[ \text{Bond Payable} - \text{Discount} \right] = \text{NBP} + \text{RE} \\
2001 & \quad (600) = 159 \quad 9,643 \quad (759) \\
2002 & \quad (600) = 171 \quad 9,815 \quad (771) \\
2003 & \quad (600) = 185 \quad 10,000 \quad (785)
\end{align*}
\]

Bond issued at a Premium
Coupon rate 6% > Market rate at issuance 4%

\[
\text{Cash} = \left[ \text{Bond Payable} + \text{Premium} \right] = \text{NBP}
\]

\[
\begin{align*}
\text{Issue} & \quad 10,555 \quad \left[ \text{10,000} + 555 \right] = 10,555 \\
\text{Cash} & \quad \left[ \text{Bond Payable} + \text{Premium} \right] = \text{NBP} + \text{RE} \\
2001 & \quad (600) = (178) \quad 10,377 \quad (422) \\
2002 & \quad (600) = (185) \quad 10,192 \quad (415) \\
2003 & \quad (600) = (192) \quad 10,000 \quad (408)
\end{align*}
\]

Bonds - disclosures

- **Balance sheet**
  - Current portion of L-T debt in current liabilities
  - Long-term debt
- **Income Statement**
  - Interest expense
- **Indirect SCF**
  - Operations - interest accruals not yet paid, amortization of discount/premium
  - Investing - purchase / sale of available for sale debt
  - Financing - proceeds, repayment + supplemental disclosure of cash paid for interest
- **Notes**
  - Details on all of the above
Bond Disclosures

A summary of long-term debt, including current maturities, as of December 31 is as follows (interest rates are as of December 31, 1997):

(In Millions)

<table>
<thead>
<tr>
<th></th>
<th>1997</th>
<th>1996</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secured notes, 6.13% to 8.90%, averaging 7.16%, due through 2014</td>
<td>$1,295</td>
<td>$819</td>
</tr>
<tr>
<td>Debentures, 8.05% to 11.11%, averaging 9.77%, due through 2016</td>
<td>785</td>
<td>624</td>
</tr>
<tr>
<td>Convertible debentures, 7.75%, due 2010</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Royalty notes, 4.25% to 11.60%, averaging 7.65%, due through 2008</td>
<td>70</td>
<td>64</td>
</tr>
<tr>
<td>Special facility bonds, 5.45%, due 2004</td>
<td>130</td>
<td></td>
</tr>
<tr>
<td>Less: Unamortized discount on debt</td>
<td>(13)</td>
<td>(9)</td>
</tr>
<tr>
<td>Current maturities</td>
<td>(235)</td>
<td>(165)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$2,092</strong></td>
<td><strong>$1,661</strong></td>
</tr>
</tbody>
</table>

Does the Balance Sheet Represent the Market Value of Debt?

Shoney's, 1999

Subordinated zero-coupon debentures, due April 2004 $122,520,712 $112,580,014

What is the effective interest rate Shoney has used?

Zero coupon bond value, \( P \), with \( n \) periods to maturity:

\[
PV = \frac{FV}{(1+r)^n}
\]

\[
r = \left(\frac{FV}{PV}\right)^{1/n} - 1
\]

What is the market interest rate of the debt? The Wall Street Journal reported in 1999 that Shoney's debt was selling for 210 per thousand, with 5 years until maturity.

\[
FV = PV_0 \times (1+r)^n
\]

\[
n = \left(\frac{FV}{PV_0}\right)^{1/n} - 1
\]

Shoney's Statement of Cash Flows: Effect of Discount Amortization

Net cash provided by operating activities $34,521,046 $55,083,923

<table>
<thead>
<tr>
<th>Years Ended</th>
<th>October 31</th>
<th>October 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating activities</td>
<td>1999</td>
<td>1998</td>
</tr>
<tr>
<td>Net loss</td>
<td>$(282,826,388)</td>
<td>$(107,712,922)</td>
</tr>
<tr>
<td>Adjustments to reconcile net loss to net cash provided by operating activities:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation and amortization</td>
<td>41,162,155</td>
<td>49,340,252</td>
</tr>
<tr>
<td>Interest expense on zero coupon convertible debentures and other noncancelable charges</td>
<td>$16,520,832</td>
<td>$18,508,713</td>
</tr>
<tr>
<td>Deferred income taxes</td>
<td>(1,890,000)</td>
<td>38,088,000</td>
</tr>
<tr>
<td>Gain on disposal of property, plant and equipment</td>
<td>(23,230,798)</td>
<td>(9,417,528)</td>
</tr>
<tr>
<td>Impairment of long-lived assets</td>
<td>16,434,046</td>
<td>49,413,168</td>
</tr>
<tr>
<td>Changes in operating assets and liabilities:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notes and accounts receivable</td>
<td>1,834,878</td>
<td>1,965,717</td>
</tr>
<tr>
<td>Inventories</td>
<td>(492,529)</td>
<td>1,236,546</td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>(1,676,202)</td>
<td>1,450,081</td>
</tr>
<tr>
<td>Accounts payable</td>
<td>(28,826,398)</td>
<td>2,524,508</td>
</tr>
<tr>
<td>Deferred income and other liabilities</td>
<td>(444,616)</td>
<td>4,243,692</td>
</tr>
<tr>
<td>Net cash provided by operating activities</td>
<td>34,521,046</td>
<td>55,083,923</td>
</tr>
</tbody>
</table>

The annual discount amortization on the zeros (which is equal to the annual interest expense on the zeros) is noncash expense and is added back to NI to reconcile to FCF.
Early Retirement of Debt

You repurchase Zero-Coupon bonds (Face Value = $11,910) in the open market at the start of 2002 (2 years to maturity) when the market rate is 5%. The market rate of interest at time of issue was 6%.

What is the market price of the bonds at that time?

\[ PV_0 = \frac{FV_n}{(1+r)^n} \]
\[ PV_0 = \frac{11,910}{(1.05)^2} = 10,803 \]

What is the effect on the BSE and financial statements?

\[ \text{Cash (A) = Bond Principal - Discount + RE} \]
\[ \text{BB} \]
\[ 11,910 - 1,310 = 10,803 \]
\[ 11,910 - 1,310 = 203 \]

The gain or loss on early retirement of debt is reported as an extraordinary item on the income statement.

What is the journal entry?

Bonds - debt covenants (TCBY)

Borrower will at all times maintain

- a ratio of Current Assets to Current Liabilities... that is greater than 2.0...
- a Profitability ratio greater than 1.5... [defined as] the ratio of Net Income for the immediately preceding period of 12 calendar months to Current Maturities of Long Term Debt...
- a Fixed Coverage Ratio greater than 1.0... [defined as] the ratio of Net Income... plus noncash Charges to Current Maturities of Long Term Debt... plus cash dividends... plus Replacement CapEx of the Borrower

[Borrower will not] sell, lease, transfer, or otherwise dispose of any assets... except for the sale of inventory... and disposition of obsolete equipment... to repurchase the stock of TCBY

[Borrower agrees it will not take on new loans if] the aggregate amount of all such loans... would exceed 25% of the consolidated Tangible Net Worth of the Borrower...