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Liberty Company Bond Teaching Resource: Using A Zero-Coupon Bond To Clarify Bond Liability Accounting

Daniel J. Jones, CPA, MBA, Assumption College, USA

ABSTRACT

Accounting for discounted and premium bond liabilities presents challenges for most students. Fortunately, committed educators can do something about the issue. In this teaching resource, the author presents an approach to simplify bond accounting concepts. Reversing the sequence that bond interest rates are introduced and explained can have a favorable effect on student comprehension.

There are two interest rates associated with a bond: 1) a market rate and 2) a contract rate. When explaining bond fundamentals, it is natural to explain the features of a bond, including its contract interest rate, early in the discussion. This approach makes it difficult to explain later that the only effective interest rate on a bond is the market interest rate. Students must realize that the contract rate is not an effective interest rate. It is a percentage that is used to determine periodic cash payments - not interest expense.

The Liberty Company Bond is a zero-coupon bond, similar to a U.S. Savings Bond that some students received as a graduation gift. Because the bond has only one non-zero interest rate, students are able to comprehend the nature and effect of both market and contract interest rates.

Keywords: Bond Accounting; Accounting for Bond Liabilities; Bonds Payable; Bond Discounts; Zero-Coupon Bonds

INTRODUCTION

*W*hy do so many students have difficulty understanding the fundamentals of accounting for bond liabilities? What can accounting professors do about it? These are important questions, and this paper answers them.

The most difficult topic for many introductory accounting students is accounting for bond liabilities. There are two primary reasons for this situation:

- Accounting textbooks feature the *gross method* of accounting for bond liabilities. In this method, there is no single general ledger account that represents of the *net bond liability* (bond carrying value) for discounted and premium bonds. The carrying value is the net balance of two accounts.
- Many students get confused regarding a bond's two interest rates: 1) contract and 2) market.

Ronald Huefner tackles the first of these reasons in his persuasive paper (Huefner, 1999). He makes a case for professors to supplant the *gross method* in favor of the *net method* of accounting for bond liabilities. The net method records the net bond liability in one "Bonds Payable (Net)" account. Unfortunately, it is difficult to teach the net method using mainstream accounting principles textbooks.

This paper addresses the second source of difficulty regarding bond accounting concepts - confusion regarding a bond's two interest rates. When covering bond liabilities, it is natural for instructors to explain the fundamental features of a bond early in the discussion. In doing so, the contract rate of interest is among the first bond features to be introduced. This rational approach presents a hidden pitfall: it is difficult to explain subsequently that the only effective interest rate on a bond is the market rate - the second interest rate that is introduced. Many fail to grasp that a contract (coupon) rate is not an effective rate of interest at all and that the market rate of interest determines interest expense on a bond.

The Liberty Company Bond (LCB) problem presents a remedy to this learning impediment. Instructors who use the LCB reverse the sequence that the two interest rates are introduced and explained: market interest rates are covered in class before contract rates. This is accomplished by initiating bond coverage with a zero-coupon bond - a liability with one easy-to-comprehend interest rate. Covering the LCB problem enables students to understand the following points regarding a discounted bond:

- A bond liability increases each period because of the market (effective) interest rate.
- A bond coupon (zero in this case) determines only the periodic cash payment (zero in this case) from the issuer to the bondholder - not interest expense.

The LCB problem can be used effectively in *introductory accounting* and *intermediate accounting* courses. It presents an uncomplicated example of a bond issued at a discount - specifically a zero-coupon bond with only one non-zero interest rate.

Using the LCB problem fosters four learning objectives:

1. It helps faculty explain bond accounting concepts to students. This learning approach builds upon what students already know regarding interest expense.
2. It enables students to understand contract interest rates and market interest rates.
3. It enables students to understand bond cash flows, interest expense, and net bond liabilities for discounted bonds.
4. It provides a foundation that faculty and students can refer to when students have difficulty with concepts relating to accounting for bond liabilities. As textbooks continue to feature the gross method, the LCB enables students to understand bond liability chapters as they are currently written.

The *Liberty Company Bond* teaching resource is presented next, followed by the *Liberty Company Bond Solution Handout* and *Instructor Notes and Implementation Guidance*.

LIBERTY COMPANY BOND

Liberty Company issued a zero-coupon bond and received \$500 cash on January 1, 2001. Liberty Company adjusts its accounts annually, not monthly. This bond is the equivalent of a \$1,000 U.S. Savings Bond that has an effective rate of interest of 8% per year, compounded annually. The contract (coupon) rate of interest on the bond is zero.

Table 1 presents a discount amortization schedule for this zero-coupon bond from the perspective of the issuer, Liberty Bank.

Table 1: Liberty Bond Discount Amortization Schedule (Using Effective-interest Method)

	Interest Period	(A) Bond Interest Expense	(B) Cash Paid (Based on Coupon Rate)	(C) Discount Amortization (Incr. in Liab.)	(D) Unamortized Discount	(E) Carrying Value (Net Bond Liability)
1/1/2001					\$500.00	\$500.00
	2001	\$ 40.00	\$ 0.00	\$ 40.00	460.00	540.00
	2002	43.20	0.00	43.20	416.80	583.20
	2003	46.66	0.00	46.66	370.14	629.86
	2004	50.39	0.00	50.39	319.76	680.24
	2005	54.42	0.00	54.42	265.34	734.66
	2006	58.77	0.00	58.77	206.56	793.44
	2007	63.47	0.00	63.47	143.09	856.91
	2008	68.55	0.00	68.55	74.53	925.47
	2009	74.04	0.00	74.04	0.50	999.50
3 days →	2010	0.50	0.00	0.50	0.00	1,000.00
Company redeemed the bond at face value of \$1,000.00 on January 3, 2010.						

Required: In the journal below, record the following for Liberty Company - the bond issuer:

1. Prepare Liberty Company’s journal entry for the bond issuance on Jan. 1, 2001.
2. Prepare Liberty Company’s journal entry for the interest expense accrual on Dec. 31, 2001. Use the effective-interest method that was used in table above.

Liberty Company General Journal

Date	Account	Dr.	Cr.
Jan. 1, 2001 (issue date)	Cash	500.00	
Dec. 31, 2001 (interest accrual at end of year)			

LIBERTY COMPANY BOND SOLUTION HANDOUT

Required: In the journal below, record the following for Liberty Company - the bond issuer:

1. Prepare Liberty Company’s journal entry for the bond issuance on Jan. 1, 2001.
2. Prepare Liberty Company’s journal entry for the interest expense accrual on Dec. 31, 2001. Use the effective-interest method that was used in Table 1.

Liberty Company General Journal

Date	Account	Acct. Type	Dr.	Cr.
Jan. 1, 2001 (issue date)	Cash	Asset	500.00	
	Discount on Bonds Payable	Contra-Liab.	500.00	
	Bonds Payable	Liability		1,000.00
Dec. 31, 2001 (interest accrual at end of year)	Bond Interest Expense	Expense	40.00	
	Discount on Bonds Payable	Contra-Liab.		40.00

Postings to General Ledger T-Accounts that Comprise *Net Bond Liability* (in 2001)

Bonds Payable (Liability)		Discount on Bonds Payable (Contra Liability)	
1,000.00	1/1/2001	1/1/2001 500.00	40.00 12/31/2001
1,000.00	12/31/2001 Balance	12/31/2001 460.00	

A credit to either of these accounts increases the *Net Bond Liability* (bond carrying value). "Bonds Payable" is always reported at face value. "Discount" decreases continually until it has a zero balance on maturity date.

Net Bond Liability (bond carrying value) is the *net balance* of these two accounts. *Net Bond Liability* increases from \$500 on 1/1/01 to \$540 on 12/31/2001.

Note: Students commonly get confused between the two rates of interests regarding bonds. They should understand the following:

- The market (effective) rate of interest on the bonds determines interest expense to the issuer and interest revenue to the bondholder. Annual interest expense is *8% times Net Bond Liability*, whether the coupon rate is greater than 8%, equal to 8%, or less than 8% (even 0% as in this case).
- The coupon (contract) rate of interest determines the periodic cash payments to be paid according to the bond contract. When solving bond problems, one should convert the coupon rate to a dollar amount. The only interest rate that remains is the market (effective) rate.

AUTHOR INFORMATION

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INSTRUCTOR NOTES & IMPLEMENTATION GUIDANCE
Liberty Company Bond

Teaching Notes And Strategies For Use

Instructors may include some or all of the following points when discussing the LCB problem and bond liabilities:

- This problem has been designed to be assigned for homework and discussed in class early in the coverage of bond liabilities.
- The Liberty Company Bond is the equivalent of a U.S. Savings Bond. Because the bond has only one non-zero interest rate, students come to understand both the nature and effect of both the market and contract rates of interest rate. The author asks which students received U.S. Savings Bonds as graduation or birthday gifts and uses their responses as an opportunity to have a brief discussion of the features of zero-coupon bonds.
- A bond is a long-term loan from an investor-bondholder to an issuer-borrower. While some bonds are issued at face (par) value, others are issued at a premium or discount to face value. Bonds are issued at a premium to face value when the market rate of interest required by investors is less than the bond's contract rate of interest. Bonds are issued at a discount when the market rate of interest is greater than the contract rate of interest. Zero-coupon bonds are deeply discounted at issuance.
- A source of confusion regarding discounted bonds is the fact that the contract rate of interest and the market rate of interest are different on these bonds. This teaching resource sets the contract interest rate to zero. This enables students to focus on the market rate of interest and to understand that it is the effective interest rate on a bond.
- Regarding the two interest rates regarding bonds, students should understand the following:
 - The market rate of interest on the bonds determines the periodic interest expense to the borrower and interest revenue to the bondholder. Annual interest expense in the LCB problem is the 8% market rate times the *net bond liability* (bond carrying value), whether the coupon rate is greater than 8%, equal to 8%, or less than 8% (even 0% as in this case).
 - The contract (coupon) rate of interest is used to determine the amount of periodic cash payments to be paid by the issuer to the bondholder according to the bond contract. The fact that the contract rate is not an effective interest rate confuses many students. When solving bond problems, one should convert the coupon rate into an annuity dollar amount (zero in the LCB problem). The only interest rate that remains is the market rate, the rate used to calculate interest expense for the issuer and interest revenue for bondholders.
- In a bond discount amortization table (LCB Table 1), cash payments in Column B are less than interest expense in Column A. The excess of interest expense over cash payments increases the carrying value of the bonds through a credit to the "Discount on Bonds Payable" account.
- In a bond premium amortization table, cash payments (in Column B) are greater than interest expense (in Column A). The additional payment amount reduces the carrying value of the bonds in the form of a debit to the "Premium on Bonds Payable" account.
- Regarding alternative names for common terms:
 - The market or effective interest rate is sometimes referred to as the yield-to-maturity.
 - The contract rate of interest is also called the stated rate or the coupon rate of interest.
 - Other names for face value are par value or maturity value.
- Bondholders own financial assets that are reported on their balance sheets. These correspond to the issuer's liabilities. They also report interest revenues in their income statements in the same amount as the interest expense reported by the borrowers.
- Using the straight-line amortization method, interest expense is \$55.50 per year $[(\$1,000.00 - \$500.00)/9.01 \text{ years}]$. $9.01 \text{ years}^* = 9 \text{ years}, 3 \text{ days}$, the term of the bond in Table 1.
- LCB problem does not cover (a) purchased interest on bonds issued between interest payment dates and (b) year-end interest accruals between interest payment dates.

- Students should understand that interest expense to the borrower is distinct from periodic cash “interest payments.” Interest expense is recognized periodically by the issuer of a zero-coupon bond, such as a U.S. Savings Bond, even though its periodic payments are zero.