

INTEGRATING FINANCE AND ACCOUNTING CONCEPTS: AN EXAMPLE USING TROUBLED DEBT RESTRUCTURING WITH MODIFICATION OF TERMS

ABSTRACT

In a troubled debt restructuring arrangement where future payments under the restructuring agreement exceed the carrying amount of the loan, the excess represents interest and must be recognized over the term of the restructured debt. SFAS 15 requires that an implicit interest rate be computed to allocate payments between principal and interest. The implicit interest rate is similar to the internal rate of return (IRR) in capital budgeting covered in corporation finance or financial management. This paper illustrates the IRR function in Excel for computing the interest rate used to prepare an amortization schedule and journal entries. Students in Intermediate accounting most likely have had a course in corporation finance and studied the internal rate of return in capital budgeting; furthermore, they may have had assignments computing this utilizing an electronic spreadsheet. Thus, they may be able to relate to and understand the internal rate of return better than text book successive trials and interpolation methods or using present value formulas to solve for the implicit interest rate.

Using this approach allows students to better see the integration of concepts from finance and Intermediate accounting. Also, by using a spreadsheet (Excel, Quatro, Lotus) one can change the terms of the loan restructuring agreements and see the impact on the various aspects of the loan restructuring agreement without burdensome manual computations. This can also be used for developing critical thinking skills for "what if" situations. The new CPA exam will require students to utilize technology to solve business and accounting problems and integrate concepts from other areas. With this approach, they may be able to better solve similar problems on the CPA exam by integrating spreadsheet skills, finance and accounting concepts.

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INTRODUCTION

FASB Statement No. 114 "Accounting by Debtors and Creditors for Troubled Debt Restructurings" defines a troubled debt restructuring as ". . . the creditor for economic or legal reasons related to the debtor's financial difficulties grants a concession to the debtor that it would not otherwise consider [SFAS No. 114]. A concession is granted when the creditor agrees to accept less than the amount that is owed (either cash or the fair value of the asset which is less than the amount owed). When companies encounter a downturn in business or become overloaded with debt they may not be able to meet payments to creditors for principal and/or interest. This has been particularly true during the recent recession. In this type of situation management will try to negotiate with creditors for concessions to make the debt service more manageable. Creditors are willing to grant some concessions rather than see the firm forced into bankruptcy.

A debt restructuring may involve the following situations (the type of result also influences the accounting for the restructuring): (1) settlement of the obligation by the creditor accepting property or equity securities in full or partial settlement of the amount owed (2) continuation of the debt with a modification of terms (3) a combination of (1) and (2). More specifically, in a modification of terms where the future cash payments exceed the amount owed, an implicit interest rate must be computed and used to allocate the future payments between principal and interest [SFAS 15]. To facilitate this allocation, a debt amortization schedule can be prepared and journal entries can be made based on this schedule.

Intermediate accounting textbooks [for examples see Dyckman, Hartman, Kieso, Spiceland] show students how to compute the implicit rate using present value formulas for an annuity and one amount or the successive trials method of discounting cash flows using various interest rates and then interpolate to find the approximate implicit rate. Students then have to manually prepare an amortization schedule and prepare journal entries. It becomes burdensome to do this and students get caught up in the mechanics instead of understanding the concepts. It is particularly burdensome or time consuming if different restructuring terms are presented and computations have to be done again manually. A better and more efficient method is to use the capital budgeting IRR function in Excel and utilize cell formulas for the various aspects of the problem (interest rate computation, amortization schedule, journal entries). It also allows the student or instructor to change the terms of the agreement and easily compute a new implicit interest rate, amortization schedule and amounts for journal entries. The IRR concept for capital budgeting is covered in managerial accounting and corporation finance and students may have used electronic spreadsheets to solve these problems. Introducing this same concept in Intermediate accounting allows students to integrate concepts from finance, managerial and Intermediate accounting and better understand how these are related even though they are applied to different courses and situations. The remainder of this paper will illustrate how these concepts and computations can be easier accomplished and be made more understandable by using IRR function from Excel or other spreadsheet program. This method is not covered in Intermediate accounting text books. A comprehensive spreadsheet example will be used along with explanations.

Debt restructuring involving a modification of terms when the terms of a debt agreement are modified, the creditor may grant concessions rather than cause the debtor to default or

even have to declare bankruptcy. Modifications terms can involve one or a combination of the following: (1) forgiveness of accrued interest and/or part of the principal, (2) reduce the interest rate, and (3) extend the time period for paying the principal of the loan.

Under the restructuring agreement the future cash flows will be more or less than the debt (principal and accrued interest restructured. If the future amounts being paid are less than amount owed, the creditor has made a concession and the debtor will recognize a gain while the creditor recognizes a loss. If the future payments are more than the amount owed, the excess payments represent interest over the life of the agreement. In this instance the debtor and creditor must compute the implicit rate and allocate the payments between principal and interest using this implicit interest rate under the effective interest method. Straight line amortization is not allowed if a material difference results.

The latter debt restructuring agreement is analogous to that of a capital budgeting problem in which the IRR is computed. The example in this paper uses the Excel IRR function to illustrate the computation of the implicit interest rate and the preparation of a debt amortization schedule from which journal entries can be prepared for the loan payments.

Intermediate accounting textbooks illustrate the computation of the implicit interest rate using the successive trials method or solving for the interest rate in the present value formulas. An alternative approach involves the successive trials method by selecting an interest rate and finding the present value of the future cash flows under the restructuring arrangement. If the present value of the future cash flows, using the trial interest rate, is more than the pre-restructured debt, then progressively higher interest rates are used to find the present value until an interest rate produces a present value which is less than the pre-restructured debt. It is possible that the first interest rate selected may result in a present value which is less than

the amount owed. Then lower rates would be tried until the present value is more than the amount owed. The approximate implicit interest rate is then found by interpolation between the two interest rates (the trial rate where the present value was more than the pre-restructured amount and the trial rate where the present value was less than the pre-restructured debt). This method is often inexact as well as time consuming, confusing, and difficult for students. In my classes, I have found students better understand the implicit interest rate computation using the Excel program. Students taking intermediate accounting have had exposure to capital budgeting concepts in finance or managerial accounting and should be familiar with excel or similar spreadsheet programs.

In capital budgeting, the IRR is the discount rate which equates the present value of the future cash flows earned by the investment with the cost of the investment (i.e., a net present value (NPV) of zero). The IRR concept in a capital budgeting situation can be easily applied to a debt restructuring problem involving a modification of terms where the future cash payments exceed the pre-restructured amount and for which an implied interest rate must be computed. In a debt restructuring arrangement the amount owed at the date of restructure is conceptually similar to the investment in a capital project; the future interest and principal payments are the future cash flows associated with the investment (amount of debt being restructured).

EXAMPLE

The spreadsheet presents a scenario involving a debt restructuring agreement where the terms have been modified such that the future cash payments exceed the principal and accrued interest. Cell formulas are utilized to facilitate the computations and the printed formulas are shown so the reader can see the nature of the cell formulas. Part I of the spreadsheet presents data showing the amount owed at the date of restructure and the terms of the modification agreement. Part II presents a schedule of future cash payments to

determine if an implicit interest rate must be computed. Part III shows the analogy of the debt restructuring arrangement to a capital budgeting problem in which the IRR is computed (the implicit interest rate for the restructured debt). Part IV presents the debt amortization schedule using the effective interest method to allocate the future cash payments between interest and principal and the carrying amount (book value) of the debt for the balance sheet. From the amortization schedule, amounts for the journal entries can be determined using cell formulas. Utilizing the cell formulas allows changing the facts in Part I to automatically change the allocation of the payments in the amortization schedule and amounts for the journal entries. This example can be applied to both the debtor and the creditor. Journal entries for the restructuring arrangement are not shown in the paper because they would be similar to those presented in the textbooks once the implicit rate and amortization schedule has been determined.

RESTRUCTURED DEBT ARRANGEMENT WITH MODIFICATION OF TERMS

Part I and II of the spreadsheet.

In part I, the assumptions involve a modification of terms where the accrued interest and part of the principal is forgiven, the interest rate is reduced, and the due date is extended for the remaining principal. The assumptions are presented on the next page.

Part I Assumptions:**Amount owed at 12-31-01:**

Principal	\$10,000,000
Accrued interest	<u>500,000</u>
Total	\$10,500,000
Present interest rate	12%

Restructuring terms: (a) New principal \$9,000,000 (creditor forgives \$1 million of principal and accrued interest) (b) New interest rate 8% ©) Interest on unpaid balance starting in December 2002 with a balloon payment for new principal in Dec. 2009

Part II, the schedule for the future cash payments under the debt restructuring arrangement, is presented below:

DATE	PAYMENTS	
12/31/02	\$ 720,000	INTEREST
12/31/03	720,000	INTEREST
12/31/04	720,000	INTEREST
12/31/05	720,000	INTEREST
12/31/06	720,000	INTEREST
12/31/07	720,000	INTEREST
12/31/08	720,000	INTEREST
12/31/09	720,000	INTEREST
12/31/09	<u>9,000,000</u>	PRINCIPAL
TOTAL PAYMENTS	\$14,760,000	
	=====	

The future payments consist of interest on the new principal at the new interest rate (8% x \$10,500,000) for eight years and the payment of interest and principal in year nine. From the schedule of cash payments one can see that the total payments (\$14,760,000) are more than the amount owed (\$10,500,000) at the restructuring date. While it may appear that this is a loss to the debtor and a gain to the creditor, SFAS No. 15 stipulates that the debtor may not recognize a loss and the creditor may not recognize a gain for this excess. Under

SFAS No. 15 the excess being paid represents interest on the new debt arrangement over the life of the restructuring period. From the table this results in interest of (Total payments of \$14,760,000 less the \$10,500,000 debt and accrued interest restructured). The result of the table above results in interest of \$426,000 (Total payments of \$14,760,000 less the \$10,500,000 debt and accrued interest restructured). The interest must be recognized over the life of the restructured loan (eight years) as the payments are being made using the implicit interest rate. To determine the amount of interest associated with each payment, the implicit interest rate must be computed and recognized as interest expense (income) over the life of the loan using the effective interest method [SFAS 15].

Part III: Computing the implicit interest rate using the IRR function:

To compute the IRR, the initial outlay for the investment and the future cash flows from the investment must be entered in the spreadsheet. In this example, the initial investment is the amount owed at the date of restructuring (year 2002). The future cash flows are the interest payments for years 2002-2008 and the final interest payment and principal due in 2009. This is presented in Part A. Part B computes the IRR (implicit interest rate) for the debt that was restructured. Part III of the spreadsheet is shown on the next page.

PART III COMPUTING THE IMPLICIT INTEREST RATE

A. SCHEDULE OF CASH PAYMENTS :

YEAR	ITEM	AMOUNT	cell refernc.
2001	PRIN & INT	\$10,500,000	H6
2002	INTEREST	720,000)	H7
2003	INTEREST	(720,000)	H8
2004	INTEREST	(720,000)	H9
2005	INTEREST	(720,000)	H10
2006	INTEREST	(720,000)	H11
2007	INTEREST	(720,000)	H12
2008	INTEREST	(720,000)	H13
2009	PRIN & INT	(9,720,000) ###	H14

The principal must also be entered on the line for the final payment with the interest instead of the next line alone. Otherwise the program IRR function will consider this as being paid in the next year (2010) instead of 2009 which will give an erroneous interest rate.

Excel IRR function formula: **[IRR(.04, H6..H14]**

The Excel IRR function, "IRR (guess rate, cash flows)" is comprised of two parts: (1) a guess rate to start the iterative process and (2) the future cash flows (payments under the restructuring arrangement). To easier facilitate this computation and to use what if situations, it is common to enter the future payments as a range of cell formulas where these payments are located on the spreadsheet instead of the actual amounts. The guess rate is entered in decimal form to start the iterative process to compute the IRR (implicit interest rate). Any interest rate (the guess rate) and the cells range containing the payments are entered in the formula. The guess rate entered is simply a starting point for the IRR iteration process. In this example, the IRR function is "IRR(.04, H6... H14)". Using the IRR function, excel will then find the present value of the cash flows in cells H6 to H14 at 4% to determine if the NPV is zero. If the NPV is not zero using the 4 % guess rate, the program uses different interest rates until it finds the interest rate which makes the NPV zero (i.e, the present value of the loan payments equal to the amount of debt restructured). This interest rate will be printed on the spreadsheet in the cell where the formula was entered.

In this example, the IRR for the cash payments presented is 5.3814%. This represents the implicit interest rate for the debt restructuring arrangement. {note: in this example, the amount owed at the date of restructure is shown as an inflow (positive amount) at time zero-the restructuring date-and the future interest and principal payments are shown as outflows (negative amounts)}. In a capital budgeting problem, the investment (analogous to the amount restructured under the debt arrangement) is normally shown as a negative amount indicating a cash outflow, and the future cash inflows are shown as positive amounts. It doesn't make any difference how these are

shown. The amount owed at the restructuring date can be shown as a negative amount and the future payments shown as positive amounts. It may be more logical to use the former because the amount being restructured can be thought of as an inflow of cash and the future interest and principal payments are cash outflows. Either method results in the same implicit interest rate.

Part IV: Amortization Schedule for Restructured Debt:

Part IV below presents the amortization schedule for the restructured debt using the effective interest method based on the implicit interest rate computed in part III.

<u>Date</u>	<u>Payment</u>	<u>Effective Interest</u> <u>(5.3814% x CV)</u>	<u>Reduction of Carrying Value</u>	<u>Carrying Value</u>
12/31/01	balance of principal and interest			\$10,500,000
12/31/02	\$ 720,000	\$565,047	\$154,953	10,345,047
12/31/03	720,000	556,708	163,292	10,181,755
12/31/04	720,000	547,921	172,079	10,009,676
12/31/05	720,000	538,661	181,339	9,828,337
12/31/06	720,000	528,902	191,098	9,637,239
12/31/07	720,000	518,618	201,382	9,435,858
12/31/08	720,000	507,781	212,219	9,223,639
12/31/09	720,000	496,361	223,639	9,000,000
12/31/09	<u>9,000,000</u>		<u>9,000,000</u>	(0)
Total	<u>\$ 14,760,000</u>	<u>\$426,000</u>	<u>\$10,500,000</u>	

From the schedule one can see how the future cash payments (interest) is allocated between interest expense for the debtor (income for the creditor) and principal. The interest expense (income) is computed using the interest rate that was computed using the IRR function in Part III. From the amortization schedule journal entries can be prepared. To ease the process, if the facts of the modification are changed, cell formulas that relate to cells in the amortization schedule should be utilized rather than typing in the amounts in the journal entries from the amortization schedule. Utilizing cell formulas enables all amounts in the various schedules and journal entries to automatically change if any of the facts in part I of the problem are changed. This paper used the excel spreadsheet but other spreadsheet programs (Lotus 1-2-3 and Quatro Pro) can also be utilized. The only difference is how the formula is arranged. For example, in Lotus 1-2-3 the formula is “@IRR(range of cash flows, guess rate)”.

SUMMARY AND CONCLUSIONS

This paper has shown how a debt restructuring problem, involving a modification of terms where the future cash payments exceed the amount owed at the restructuring date, can be restated in terms of a capital budgeting problem using the internal rate of return to find the implicit interest rate for the debt restructuring agreement. It further showed how the IRR function in excel can be used to compute this interest rate and then used to prepare an amortization schedule for the restructured debt. This approach is useful because students in accounting are familiar with spreadsheet programs and have been exposed to capital budgeting in finance and managerial accounting.

Students can better understand and easier compute the implicit rate using a spreadsheet rather than manually using the successive trials method or trying to solve for the interest rate in the present value formulas. By utilizing cell formulas in the spreadsheet it also facilitates changing the terms of the agreement and then see how the amount of interest and principal payments change without manually making the computations. If cell formulas are used for the dollar amounts in the journal entries, these amounts will also be automatically changed when the amounts are changed in the journal entries. This allows students to readily see the impact of various restructuring arrangements and concentrate on the important concepts instead of doing the computations manually and losing sight of the real nature of debt restructuring agreements.

Students can also utilize these skills on the job. Starting in 2004, the CPA exam is changing to a computerized exam with finance concepts and technology integrated into accounting problems [AICPA—for more detail see www.cpa-exam.org]. If students have utilized the spreadsheet method in intermediate accounting they will be prepared to solve similar problems that may appear on the new PA exam. Another advantage of using a lotus spreadsheet is that various restructuring assumptions can be used to see the effect on the interest rate and be combined with other types of arrangements. This is easy to do once all the formulas have been entered. One only needs to change the assumptions. In using this program, students should be instructed to enter all amounts and computations in the spreadsheet using cell references for amounts needed in the various computations. Using cell references facilitates automatic recalculation of various related items when the assumptions are changed. The purpose is to take advantage of the power and functions of lotus rather than reentering new formulas for

each restructuring assumption.

Students should find this a helpful and understandable exercise relieving the tedious manual computations and also help them relate different but conceptually similar concepts in finance and accounting. Often, concepts are learned in isolation in different courses without relating them to similar topics in subsequent courses.

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