

EVALUATING CREDIT SALES IN A FINANCIAL FRAMEWORK

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This paper examines credit sales and the conditions that cause credit sales to lead to net income. The critical values are the default rate on credit sales, the variable costs of the goods sold on credit, that average collection period and the cost of capital financing credit sales. The study demonstrates when credit sales add to value and when they are too costly to extend.

INTRODUCTION

One of the most important elements of short-term financial management is credit management. The credit standards criteria that determine which customers receive credit have a significant impact on total sales. Credit sales also require some source of funding, which may affect debt levels and interest expenses.

Most discussions of credit sales in finance textbooks focus on receivables turnover and the average collection period. (See any popular text, such as Brigham and Ehrhardt (2002), Brealey and Myers (2002),

Van Horne (2002), Ross, Westerfield and Jaffe (2003), or Keown, Martin, Petty and Scott (2003).) Receivables turnover and the average collection period are excellent quantitative indicators of the effectiveness of a company's credit policy. However, they are both woefully deficient when a student asks how the effective management of credit sales can be used to enhance net income or firm value.

Textbook discussions of credit policy tend to be qualitative in nature and usually revolve around the five A's of credit: character; capacity; capital; collateral; and conditions (Brigham and Ehrhardt, 2002). The discussions acknowledge that credit sales enhance total sales which, in turn, add to net income and value. The downside of credit sales is the fact that some of these sales are not collected. Unpaid accounts receivable have a negative effect on income, and therefore, should be avoided. Not surprisingly, students conclude the obvious. You should sell on credit only to buyers that will pay your invoice and deny credit to those customers that will renege on their obligation to pay. Of course, firms do not know a customer's future behavior prior to the extension of credit.

This qualitative discussion also ignores the financial ratios and variables that determine the dollar amount those credit sales add to net income. This is especially frustrating when teaching financial management. Many discussions, such as financial ratios, cash conversion cycles, economic order quantities and net present values (to name a few) resolve to a specific number, which suggests a course of action.

However, scant attention is given to the connection between credit sales and the value of a firm. No simple framework exists that explicitly links credit sales to net income and value. Even textbooks that focus on short-term financial issues (such as Maness and Zeitlow (1993), where an entire chapter is devoted to accounts receivable management) generally include no discussion of the costs and revenues associated with credit sales. As a result, firms often struggle with credit management, never fully grasping what variables should be the focus in credit management.

This paper proposes an equation that specifies the revenues and costs associated with credit sales. This analysis would be especially appropriate in an intermediate finance course or an MBA corporate finance class as part of short-term asset management. It is similar in many ways to inventory management (another short-term asset management topic), such as the economic order quantity (EOQ).

THE FINANCIAL FRAMEWORK

Credit sales= contribution to net income depends on the level of credit sales and several financial variables intermediate students are already familiar with. These variables include the net profit margin, the cost of goods sold as a percent of sales, the level of accounts receivable, the percent of credit sales collected and the interest rate. The following equation describes the contribution of credit sales to net income:

$$NI_{CS} = REV_{CS} - CofGS_{CS} - CC_{CS}, \text{ where:} \quad (1)$$

NI_{CS} = Net Income from Credit Sales

REV_{CS} = Revenues from Credit Sales;

$CofGS_{CS}$ = Cost of the goods sold on credit (the variable cost); and

CC_{CS} = Carrying Cost of Credit Sales.

The revenue from credit sales (REV_{CS}) is the level of income that will be produced from the credit sales actually collected. REV_{CS} depend on the level of credit sales, CS, and the accounts receivable default rate, ARDR (the percentage of uncollected credit sales to total credit sales). Since revenues come only from collected credit sales, the product of those revenues and the net profit margin produces the income from credit sales. Therefore, the revenue from credit sales can be expressed as:

$$REV_{CS} = CS(1-ARDR), \text{ where:} \quad (2)$$

CS = total credit sales; and

ARDR = accounts receivable default rate, the percentage of credit sales NOT collected.

To determine the net income from credit sales, the costs of credit sales must be considered. The first cost source in Equation 1 is the cost of the goods produced and sold on credit ($CofGS_{CS}$). Students often equate the loss with the uncollected accounts receivable. The cost of all of the credit sales must be paid, whether they are collected or not. However, only the cost portion the credit sale is lost. The potential income that would have been earned from this credit sale is also lost. However, since this analysis deals with the actual net income from the credit sale, the income from uncollected sales was never captured, and is, therefore, not included. Only the production costs were incurred, so they represent unrecovered costs. (This distinction between what to include as **Unrecovered costs** is basically one of accounting versus finance perspective. Since the intended audience for this study are students receiving their first exposure to short-term asset management, the simpler accounting approach is used.) The cost of goods sold as a percent of sales represents those unrecovered costs. The variable $CofGS_{CS}$ can be expressed as:

$$CofGS_{CS} = CS(CofGS\%), \text{ where;} \quad (3)$$

$CofGS\%$ = the cost of goods sold as a percent of sales.

The final cost of credit sales, the carrying cost of credit sales is the carrying costs associated with financing the outstanding accounts receivable (CC_{CS}). (This carrying cost is analogous to the carrying cost of inventory in the EOQ model.) The carrying cost of accounts receivable depends on the total cost of the goods sold on credit and the cost of funds. As before, the actual cost of the sales reflected by the accounts receivable (which is the amount that must be financed) is less than the balance sheet value of accounts receivable, because credit sales are entered as accounts receivable at their retail value. The cost of the goods sold on credit is the product of the percent cost of goods sold (CofGS%) and the level of accounts receivable (AR). The product of the cost of the goods sold and the cost of funds (i) is the carrying cost of the accounts receivable. The variable CC_{CS} can be found as:

$$CC_{CS} = AR(\text{CofGS}\%)i, \text{ where:} \quad (4)$$

i = the cost of funds.

Substituting Equations 2, 3 and 4 into Equation 1, the net income flow from credit sales (Equation 1) is:

$$NI_{CS} = CS(1-ARDR) - CS(\text{CofGS}\%) - AR(\text{CofGS}\%)i \quad (5)$$

NUMERICAL EXAMPLE

Consider a firm that sells \$10 million on credit during the year, where 5% of these sales are not collected. The firm's cost of goods sold is 60% of sales. The firm carries an accounts receivable balance of \$1,000,000, which corresponds to an average collection period is 36 days (360-day year). Finally, the cost of funds is 9%. What do these credit sales add to net income? If all credit sales were collectable and accounts receivable were costless to finance, then the \$10 million in sales with a 5% net profit margin would yield \$500,000. However, since 2.5% of the credit sales are not collected, less than \$500,000 will be added to net income. In addition, there are the costs of funds financing the credit sales as well as any

administrative costs associated with the extension of credit that also must be considered. The net addition to net income from credit sales is:

$$NI_{CS} = [CS(1-ARDR) - CS(CofGS\%) - AR(CofGS\%)i](1-t) \quad (2)$$

$$NI_{CS} = [\$10,000,000(1-2.5\%) - 10,000,000(60\%) - \$1,000,000(60\%)9\%](1-.4) \quad (3)$$

$$NI_{CS} = [\$9,750,000 - \$6,000,000 - \$54,000](1-.4) = \$3,696,000 \quad (4)$$

The \$9,750,000 represents the credit sales collected, while the \$6,000,000 is the cost of producing the credit sales and the \$54,000 is the interest cost on \$600,000, the production costs of \$1,000,000 in the outstanding credit sales. The increase in net income from the credit sales, the \$3,696,000, is less than 5% of the \$10 million total credit sales.

Using this model will also indicate when credit sales should be reduced or eliminated entirely. Consider another case of \$10,000,000 in credit sales. However, the accounts receivable default rate is 13%, average collection period is 72 days (implying accounts receivable of \$2,000,000), the cost of goods sold is 85% of sales and the cost of capital is 14%.

$$NCF_{CS} = [CS(1-ARDR)N(M - CS(ARDR)CofGS\% - AR(CofGS\%)i)](1-t) \quad (5)$$

$$NI_{CS} = [\$10,000,000(1-13\%) - 10,000,000(85\%) - \{ \$2,000,000(85\%)14\% \}] \quad (6)$$

$$NI_{CS} = \$8,700,000 - \$8,500,000 - \$238,000 = -\$38,000 \quad (7)$$

The higher levels of uncollected accounts receivable, lower gross profit margin, higher average collection periods and higher capital costs makes this \$10,000,000 in credit sales results in a loss of \$38,000. The firm's net income would improve \$38,000 if these \$10,000,000 in credit sales were discontinued. The firm's value would also show a marked increase as a result of the elimination of credit sales.

CONCLUSION

This paper has developed a simple framework that highlights the variables that determine the level of net income as a result of credit sales. Obviously, the higher the accounts receivable default rate, the lower the addition to net income from credit sales. A lower gross profit margin means any sale, cash or credit, yields a smaller addition to net income. The higher the cost of goods sold as a percent of sales, the less credit sales add to net income because of the unrecovered costs from uncollected credit sales. A higher level of accounts receivable (reflected by a higher average collection period) corresponds to a higher carrying charge for a given cost of capital. Finally, higher cost of funds implies a higher carrying cost for a given level of accounts receivable.

The significance of this analysis is that it identifies the net income from credit sales that add to shareholder value. It also highlights what variables managers can influence to maximize the cash flows from credit sales. Finally, it provides a justification for changing credit standards as the cost of funds change. If the cost of funds increase, more stringent credit standards should lower the default rate on accounts receivable. Reducing the cost of uncollected sales would help offset the higher carrying costs.

References

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