

THE STATEMENT OF CASH FLOWS USING FINANCIAL STATEMENT EQUATIONS

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ABSTRACT

This paper addresses one of the more difficult topics in teaching MBA level financial management, the statement of cash flows. By employing financial statement equations in preparing the statement of cash flows, students: (1) are employing tools that they are more familiar and comfortable with which mitigates their anxiety and enhances their understanding, (2) are better able to understand the logic of the statement of cash flows and the relationships that exist between it and the income statement and balance sheet, (3) obtain a global perspective of the firm's activities and a clearer understanding of how managerial decisions impact the financial statements, and (4) are better prepared to integrate their new knowledge of financial statements into the remainder of the MBA curricular core.

KEY WORDS: Cash flow statement, financial statement equations

JEL: G40, M40

INTRODUCTION

Financial accounting has typically been taught from the preparation perspective. Thus, students learned to prepare the statement of cash flows using the double entry bookkeeping model of debits and credits. While these students are quite capable of preparing the statement of cash flows, they many times fail to grasp a keen understanding of the statement and its usefulness in managerial decision making. Accordingly, this paper employs an algebraic approach in preparing the statement of cash flows with an emphasis on tying together the interrelationships that exist among all the financial statements. This moving away from the debit-credit model to an algebraic approach is more beneficial to the regular MBA student in the long run because it focuses on the fact that the financial statements are the mathematical models of the firm. Financial statement equations make these relationships more explicit and provide a truer perspective and a deeper understanding of the financial statements. Furthermore, comprehension of the algebraic relationships is extremely important for the student when progressing through the MBA curriculum and operating in the real world.

The purpose of this paper is to explain in simple algebraic terms the preparation of the statement of cash flows to MBAs using financial statement equations. The first part of this paper discusses the development and role of the statement of cash flows as the third major financial statement. In addition, this section presents a brief overview of the presentations of the statement of cash flows by several widely used corporate finance and financial accounting texts. Next, the financial statement equation approach to teaching the statement of cash flows is presented. Finally, the advantages of the algebraic approach using basic financial statement equations are discussed including the ease of explaining the direct approach for determining cash flow from operations, the comprehension of the interrelationships among the financial statements, the ability to develop and understand pro forma financial statements, and the facilitation of financial decision making.

BACKGROUND

Investors and creditors use financial statements to make financial decisions. These users develop an understanding of a firm's sales, expenses and profitability by reviewing the income statement. They develop a sense of the firm's financial position at a particular point in time from reviewing the balance sheet. However, with only these two financial statements to review, these users do not have complete information on the extent of a firm's operating, financing, and investing cash flow activities. For example, the cash proceeds from the disposal of investments in property, plant and equipment or the extent of cash flows from long-term debt issuances and repayments are not disclosed in either financial statement. To overcome this problem, a third financial statement, the statement of cash flows is provided to financial statement users. The objective of this statement is to present information on cash provided and used from all activities of the reporting entity.

Historically, cash-basis accounting preceded accrual accounting, but had limitations in measuring an entity's income for the period. With accrual accounting accountants were better able to match revenues and expenses yielding a more precise measure of the entity's income for the period. However, with only a balance sheet and income statement to review, financial managers did not have complete information with respect to the flow of funds within the entity. Thus, a funds statement was developed by financial managers as a tool to indicate, on a historical basis, where the funds came from and how they were used. With wide spread reporting by a significant number of companies of the sources and uses of funds (funds statement) in annual financial reports to shareholders and with the support of the principal stock exchanges, the Accounting Principles Board (APB) in 1963 issued Opinion No. 3, *The Statement of Source and Application of Funds*, which encouraged, but did not require, the presentation of a funds statement in the annual report to shareholders. In Opinion No. 3 the APB offered considerable latitude as to both the form and content of the funds statement, and presentation varied widely among companies.

Recognizing the increased usefulness of the funds statement to users of financial statements, the Accounting Principles Board in 1973 required its presentation in the annual report to shareholders by adopting APB Opinion No.19, *Reporting Changes in Financial Position*. In this opinion the Board sought to establish guidelines for presenting such statements including the requirement that the statement be based on a broad concept of changes in financial position and recommended that the title of the statement be changed to *Statement of Changes in Financial Position*. However, under Opinion 19, the concept of funds could still be defined broadly, primarily either as cash, working capital, or a variation on working capital. In 1987, Financial Accounting Standards Board (FASB) solved the problem of the various definitions of funds by issuing Statement No. 95 (FASB, 1987) which replaced the statement of changes in financial position with the statement of cash flows. In *SFAS No. 95*, the definition of funds was narrowed to include only cash and cash equivalents and the statement's title was changed to the statement of cash flows. The purpose of this definition of funds was to increase comparability of corporate financial reporting and to require all companies to provide information on its activities on a cash basis. On the statement, cash flows are segregated by operating activities, investing activities, and financing activities. This statement of cash flows represents a major step forward for users of financial statement data because of its relevance for analytical purposes. The mandatory focus on cash in this statement results in a more useful document than its predecessor, the statement of changes in financial position where the definition of funds was broadly interpreted across firms within the same industry.

The statement of cash flows requires classification according to the nature of the transaction (operating, investing, or financing) as opposed to the nature of the cash receipt or payment. An objective of this statement is to assist the user in assessing the reasons for differences between net income and associated cash receipts and payments. This is achieved by treating as operating activities all transactions that generally enter into the determination of net income. Another requirement of the statement of cash flows is the disclosure of noncash investing and financing transactions in a separate schedule. The required separate disclosure of noncash

transactions maintains the all important cash focus of the statement of cash flows and distinguishes it from the less informative state of changes in financial position.

The FASB Statement No. 95 allows the option of a direct or indirect method of reporting operating cash flows. The direct method reports the major classes of gross cash receipts and gross cash payments in the operating section of the statement, the summation of which is net cash flow from operating activities. Statements of cash flow developed on the direct basis separately classify as operating cash flows: cash received from customers; cash paid to suppliers and employees; interest and dividends received; interest paid; income taxes paid; and, other operating cash receipts and cash payments, if any. The FASB requires that a reconciliation of net income to net cash flow from operating activities be reported in a separate supplementary schedule when using the direct method. The indirect method of reporting operating cash flows, which is identical to the required supplementary schedule in the direct method, reconciles net income to net cash flow from operations. Net income is adjusted to remove the effects of all deferrals of past operating cash receipts and payments; all accruals of expected future operating cash receipts and payments; and all items whose cash effects are investing or financing cash flows.

This reporting change causes greater emphasis to be placed on cash flows, and justifies discussion of how the statement of cash flows may be best taught to MBA students. While the level, detail and depth of coverage differ from program to program, MBA students universally seem to struggle with this topic. Yet, it may be argued that the statement of cash flows is one of the most important accounting topics, particularly in light of the number of companies now faced with debt-laden balance sheets and whose solvencies are questionable due to the economic downturn.

Table 1: Overview of Leading Accounting Texts

Fundamental Accounting Text	Direct	Indirect	Equations	T-Accounting	Worksheet
Harrison, Horngren & Thomas	Yes	Yes	Full Equations	Yes	No
Kimmel, Weygandt & Kieso	Appendix	Yes	Simple Equations (Appendix)	Yes	No
Needles & Powers	No	Yes	No Equations	Yes	No
Phillips, Libby & Libby	Yes	Yes	Simple Equations	Yes	Appendix

This table shows the presentation techniques of the cash flow statement in leading account texts.

A review of several leading corporate finance texts (Ehrhardt & Brigham, 2008; Brealy, Myers & Marcus, 2009; Ross, Westerfield, & Jordan, 2010) reveals that these authors rely on students developing their more detailed knowledge of the statement of cash flows from their prerequisite financial accounting course. Each of these texts primarily presents a brief description of the statement in just a few pages. Therefore, several leading accounting texts (Harrison, Horngren & Thomas, 2010; Kimmel, Weygandt & Kieso, 2009; Needles & Powers, 2008; Phillips, Libby, & Libby, 2008) were reviewed to determine how leading financial accounting texts cover the statement of cash flows?

Table 1 summarizes the results of the review. First, not surprisingly all of the texts cover the indirect approach to the operating section of the statement given that 99% of surveyed companies use the indirect approach in their annual report to shareholders (AICPA, 2007). One text (Needles & Powers, 2008) does not cover the direct method at all while another (Kimmel, Weygandt & Kieso, 2009) relegates the direct method to an appendix. The other two texts cover both methods, but for one text (Phillips, Libby & Libby, 2008) the primary focus is on the indirect method while the other text (Harrison, Horngren & Thomas, 2010) provides equal coverage. Second, only one of the texts (Phillips, Libby & Libby, 2008) covers the worksheet approach, but it is relegated to an appendix. While the worksheet approach was quite useful in preparing the old statement of changes in financial position, it has lost some of its comparative advantage on the preparation side with the new statement of cash flows. Third, all of the texts employed the T-account approach in determining the cash flows for the statement. Finally, authors are beginning to employ, on an elementary level, equations to explain

the computation of the cash flows. When doing so, the equations are related to the T-account approach in determining the cash flow. Only one text did not employ any equations. However, only one text, Harrison, Horngren & Thomas (2010), provides a full set of financial statement equations in their presentation by tying the equations to the t-accounts which they represent.

FINANCIAL STATEMENT EQUATION APPROACH

The financial statement equation approach has been around for some time. Johnson (1966) analyzed algebraically the individual changes in noncurrent accounts to provide a means to calculate directly through equations the individual sources and uses of working capital needed for a funds statement. In addition, he presented an algebraic system for cash-flow analysis. In this paper we begin first with the balance sheet equation and expand it to provide a logical algebraic approach for determination of cash flows. Next, the direct approach for computing the cash flow from operations is presented using the appropriate financial statement equations.

Then, an equation for determining cash flow from operations under the indirect method is presented. Finally, financial statement equations are employed to address the cash flows from investing activities and financing activities. Table 2 presents a listing of financial statement equations and demonstrates their algebraic manipulation. In addition, an example, provided in Table 3, is employed throughout to illustrate the use of the financial statement equation approach.

Table 2: Financial Statement Equations

Financial Statement	Equations
ACCOUNTS RECEIVABLE	$A/R_1 + \text{Credit Sales} - \text{Collections} = A/R_2$ $\text{Collections} = \text{Credit Sales} - [A/R_2 - A/R_1]$
UNEARNED REVENUE	$UR_1 + \text{Cash Advances} - \text{Revenue Earned} = UR_2$ $\text{Cash Advances} = \text{Revenue Earned} + [UR_2 - UR_1]$
INVENTORY	$I_1 + \text{Purchases} - \text{COGS} = I_2$ $\text{Purchases} = \text{COGS} + [I_2 - I_1]$
ACCOUNTS PAYABLE	$A/P_1 + \text{Purchases} - \text{Payments} = A/P_2$ $\text{Payments} = \text{Purchases} - [A/P_2 - A/P_1]$ $\text{Payments} = \text{COGS} + [I_2 - I_1] - [A/P_2 - A/P_1]$
PREPAID EXPENSES	$PE_1 + \text{Prepayment} - \text{Expiration of PE} = PE_2$ $\text{Prepayment} = \text{Expiration of PE} + [PE_2 - PE_1]$
PLANT & EQUIPMENT	$P\&E_1 + \text{Acquisitions of P\&E} - \text{Cost Basis of P\&E Sales} = P\&E_2$ $\text{Acquisitions of P\&E} = \text{Cost Basis of P\&E Sales} + (P\&E_2 - P\&E_1)$
ACCUMULATED DEPRECIATION	$AD_1 + \text{Depreciation Expense} - \text{AD for Asset Sales} = AD_2$ $\text{Depreciation Expense} = \text{AD for Asset Sales} + (AD_2 - AD_1)$
NOTES RECEIVABLE	$N/R_1 + \text{Loans Made} - \text{Loans Collected} = N/R_2$ $\text{Loans Collected} = \text{Loans Made} - [N/R_2 - N/R_1]$ $\text{Loans Made} = \text{Loans Collected} + [N/R_2 - N/R_1]$
NOTES PAYABLE	$N/P_1 + \text{Borrowings} - \text{Loan Repayments} = N/P_2$ $\text{Borrowings} = \text{Loan Repayments} + [N/P_2 - N/P_1]$ $\text{Loan Repayments} = \text{Borrowings} - [N/P_2 - N/P_1]$
WAGES PAYABLE	$W/P_1 + \text{Wages Expense} - \text{Wages Paid} = W/P_2$ $\text{Wages Paid} = \text{Wages Expense} - [W/P_2 - W/P_1]$
ACCRUED LIABILITIES	$A/L_1 + \text{Accrued Expense} - \text{Payment of Accruals} = A/L_2$ $\text{Payment of Accruals} = \text{Accrued Expense} - [A/L_2 - A/L_1]$

Financial Statement	Equations
INTEREST PAYABLE	$I/P_1 + \text{Interest Expense} - \text{Interest Payment} = I/P_2$ $\text{Interest Payment} = \text{Interest Expense} - [I/P_2 - I/P_1]$
DEFERRED INCOME TAX	$DIT_1 + \text{Income Tax Expense} - \text{Income Tax Payment} = DIT_2$ $\text{Income Tax Payment} = \text{Income Tax Expense} - [DIT_2 - DIT_1]$
CAPITAL STOCK	$CS_1 + \text{Issuance} - \text{Redemption} = CS_2$ $\text{Issuance} = \text{Redemption} + [CS_2 - CS_1]$
DIVIDENDS PAYABLE	$D/P_1 + \text{Dividends Declared} - \text{Dividends Paid} = D/P_2$ $\text{Dividends Paid} = \text{Dividends Declared} - (D/P_2 - D/P_1)$
RETAINED EARNINGS	$RE_1 + NI - \text{Dividends Declared} = RE_2$ $(RE_2 - RE_1) = NI - \text{Dividends Declared}$

This table shows the key financial statement equations

Since our goal is not only to have the student prepare the statement of cash flows but also to be able to use it in decision making, we introduce the student to the concept of sources and uses of funds. The sources and uses of funds statement, a precursor of the statement of cash flows, has been one of the most useful tools for the financial manager as it indicates where, on a historical basis, cash came from and where it was used. When a firm applies for a loan, one of the first questions posed by the loan officer is *what has your firm done with the money it had?* This is usually followed by *when and how is your firm going to repay the loan?* The ability of the sources and uses statement to answer these questions and its early use attest to its managerial usefulness.

Each change in the balance sheet may be classified as either a source or a use of funds. A use of funds is an increase in an asset or a decrease in a liability or equity. A source is a decrease in an asset or an increase in a liability or equity. As indicated in Table 3, the student can easily identify the changes in the balance sheets accounts as either a source or a use. As a check, the sums of sources and uses are equal if the student correctly analyzed the balance sheet account changes. Given the concept of sources and uses of funds, we direct the student to the balance sheet equation and expand it to provide an equation for computing the cash flows.

In the equations below, A = assets, L = liabilities, E = equities, OA = other assets, CC = contributed capital, RE = retained earnings, CL = current liabilities, LTL = long-term liabilities, OCA = current assets other than cash, LTA = long-term assets, NI = net income, and D = dividends.

$$A = L + E$$

$$\text{Cash} + \text{OA} = L + E$$

$$\text{Cash} = L + E - \text{OA}$$

Substituting into the above equation $E = CC + RE$; $\text{OA} = \text{OCA} + \text{LTA}$; and $L = \text{CL} + \text{LTL}$ yields the following.

$$\text{Cash} = \text{CL} + \text{LTL} + \text{CC} + \text{RE} - \text{OCA} - \text{LTA}.$$

Since the focus of the statement of cash flows is on *flows* or changes in cash, we modify our equation to reflect the changes in the balance sheet accounts.

$$\Delta\text{Cash} = \Delta\text{CL} + \Delta\text{LTL} + \Delta\text{CC} + \Delta\text{RE} - \Delta\text{OCA} - \Delta\text{LTA}$$

Substituting into the above equation $\Delta\text{RE} = \text{NI} - \text{D}$ yields

$$\Delta\text{Cash} = \Delta\text{CL} + \Delta\text{LTL} + \Delta\text{CC} + \text{NI} - \text{D} - \Delta\text{OCA} - \Delta\text{LTA}$$

And, then rearranging we have the following.

$$\Delta\text{Cash} = \text{NI} + \Delta\text{CL} - \Delta\text{OCA} - \Delta\text{LTA} + \Delta\text{LTL} + \Delta\text{CC} - \text{D}$$

This derivation of the cash flow equation from the balance sheet equation clearly illustrates that cash flows are determined by changes in the balance sheet accounts.

The Direct Method for Cash Flow from Operations

Operating activities make up the first section of the statement of cash flows, and it can be presented using either of two methods. The direct method presents the gross operating cash flows for the period. The use of financial statement equations makes the logic of this approach apparent. The cash received from customers is derived from the accounts receivable equation,

$$\text{A/R}_1 + \text{Credit Sales} - \text{Collections} = \text{A/R}_2,$$

Which is rearranged to solve for the cash flow (collections),

$$\text{Collections} = \text{Credit Sales} - [\text{A/R}_2 - \text{A/R}_1].$$

For Carson Products, the collections would equal

$$\$460,000 = \$500,000 - [\$120,000 - \$80,000].$$

To determine the cash paid for the cost of merchandise purchased requires the use of two equations: the inventory equation and the accounts payable equation.

$$\text{I}_1 + \text{Purchases} - \text{COGS} = \text{I}_2$$

$$\text{A/P}_1 + \text{Purchases} - \text{Payments} = \text{A/P}_2$$

First, the inventory equation is solved for purchases,

$$\text{Purchases} = \text{COGS} + [\text{I}_2 - \text{I}_1].$$

Next, the accounts payable equation is solved for payments,

$$\text{Payments} = \text{Purchases} - [\text{A/P}_2 - \text{A/P}_1].$$

Then, the purchases equation is substituted into the payments equation to yield,

$$\text{Payments} = \text{COGS} + [\text{I}_2 - \text{I}_1] - [\text{A/P}_2 - \text{A/P}_1].$$

For Carson, therefore, payments for the cash paid for merchandise is equal to

$$\$287,000 = \$300,000 + [\$140,000 - \$90,000] - [\$123,000 - \$60,000].$$

Table 3: Carson Products

Jonathan Carson, president of Carson Products, considers \$16,000 to be the minimum cash balance for operating purposes. However, at the end of 2007 Carson Products has a cash balance of only \$8,000. As the company reported higher net income for the year, and issued both bonds and common stock, the decline in cash was a mystery to Jonathan.

The following additional information is available for the year 2007:

- a. Dividends totaling \$9,000 were declared and paid.
- b. Equipment was sold during the year at a selling price of \$8,000. The equipment had a cost of \$20,000 and had accumulated depreciation of \$10,000.
- c. Preferred Stock was converted into an equal amount of common stock.
- d. Long-term investments that had a cost of \$20,000 were sold during the year for \$30,000.

Required:

1. Prepare a statement of cash flows for 2007 using the indirect method.
2. Since the Cash account decreased so dramatically during 2007, the company's other executives as well as Mr. Carson were interested in seeing the statement of cash flows prepared using the direct method as well.

CARSON PRODUCTS				
Comparative Balance Sheet				
December 31, 2007, and 2006				
Assets	2007	2006	Source	Use
Current assets				
Cash	\$8,000	\$21,000	13,000	
Accounts receivable, net	120,000	80,000		40,000
Inventory	140,000	90,000		50,000
Prepaid expenses	5,000	9,000	4,000	
Total current assets	<u>273,000</u>	<u>200,000</u>		
Long-term investments	50,000	70,000	20,000	
Plant and equipment	430,000	300,000		130,000
Less: accumulated depreciation	(60,000)	(50,000)	10,000	
Net plant and equipment	<u>370,000</u>	<u>250,000</u>		
Total assets	<u><u>\$693,000</u></u>	<u><u>\$520,000</u></u>		
Liabilities and Stockholders' Equity				
Current liabilities:				
Accounts payable	\$123,000	\$60,000	63,000	
Accrued liabilities	8,000	17,000		9,000
Total current liabilities	<u>131,000</u>	<u>77,000</u>		
Bonds payable	70,000		70,000	
Deferred income taxes	20,000	12,000	8,000	
Total liabilities	<u>221,000</u>	<u>89,000</u>		
Stockholders' equity:				
Preferred stock	80,000	96,000		16,000
Common stock	286,000	250,000	36,000	
Retained earnings	106,000	85,000	21,000	
Total stockholders' equity	<u>472,000</u>	<u>431,000</u>		
Total liabilities and stockholders' equity	<u><u>\$693,000</u></u>	<u><u>\$520,000</u></u>	<u>245,000</u>	<u>245,000</u>

CARSON PRODUCTS		
Income Statement		
For the year December 31, 2007		
Sales		\$500,000
Less cost of goods sold		(300,000)
Gross margin		<u>200,000</u>
Less operating expenses		(158,000)
Net operating income		42,000
<u>Nonoperating items:</u>		
Gain on sale of investments	\$10,000	
Loss on sale of equipment	2,000	8,000
Income before taxes		<u>50,000</u>
Less income taxes		(20,000)
Net income		<u><u>\$30,000</u></u>

This table presents the Carson Products application of the development of the cash flow statement

Cash payments for income taxes is computed using the following equation,

$$DIT_1 + \text{Income Tax Expense} - \text{Income Tax Payment} = DIT_2$$

where DIT stands for deferred income tax. Solving for income tax payment yields

$$\text{Income Tax Payment} = \text{Income Tax Expense} - [DIT_2 - DIT_1].$$

For Carson this equals

$$\$12,000 = \$20,000 - [\$20,000 - \$12,000].$$

Finally, before we can compute the cash outflow for operating expenses, we must reduce the amount of operating expenses on the income statement for the amount of depreciation expense, which does not represent a cash outflow (\$20,000). The computation for depreciation expense is shown below. Here, two equations are required, the equation for prepaid expenses and the equation for accrued liabilities, as both have terms representing payments for operating expenses.

$$PE_1 + \text{Prepayment} - \text{Expiration of PE} = PE_2$$

$$A/L_1 + \text{Accrued Expense} - \text{Payment of Accruals} = A/L_2$$

Both of these equations are solved for their respective cash flows.

$$\text{Prepayment} = \text{Expiration of PE} + [PE_2 - PE_1]$$

$$\text{Payment of Accruals} = \text{Accrued Expense} - [A/L_2 - A/L_1]$$

The sum of Expiration of PE and Accrued Expense equals the operating expenses requiring a cash outlay, which is equal to the operating expenses on the income statement less depreciation expense or \$138,000 [Operating expenses less depreciation = \$158,000 - \$20,000]. Thus, we can combine these two equations by summing the payments for operating expenses to equal the cash outflow for operating expenses.

$$\text{Cash outflow for operating expenses} = \text{Operating Expense} - \text{Depreciation} + [PE_2 - PE_1] - [A/L_2 - A/L_1].$$

For Carson this equals:

$$\$143,000 = [\$158,000 - \$20,000] + [\$5,000 - \$9,000] - [\$8,000 - \$17,000].$$

The overall result is the cash flows from operations for Carson computed using the direct method in Table 4.

Table 4: Carson Products Statement of Cash Flows (Direct Method) For the Year ended December 31, 2007

Operating activities:		
Cash received from customers		\$460,000
Less cash disbursements for:		
Cost of merchandise purchased	\$287,000	
Operating expenses	143,000	
Income taxes	12,000	
Total cash disbursements		442,000
Net cash flow from operating activities		\$18,000

This table presents the Carson statement of cash flows using the direct method.

The Indirect Method for Cash Flow from Operations

Recognizing that the FASB defines cash flows from operating activities as the cash effects of all transactions and events that enter into the determination of net income, an equation reconciling net income to cash flow from operations is presented incorporating the concept of sources and uses of funds. Rather than trying to remember whether *one adds the decrease or subtracts the increase* in the balance sheet account or vice-versa, the reconciliation equation adjusts net income for the noncash charge of depreciation, adds the sources, subtracts the uses, adds back the nonoperating losses (NOL), and subtracts the nonoperating gains (NOG).

$$\text{CFO} = \text{NI} + \text{Depreciation} + \text{Sources} - \text{Uses} + \text{NOL} - \text{NOG}$$

The sources, among the operating assets and operating liabilities, for Carson Products are as follows: decrease in prepaid expenses (\$4,000), increase in accounts payable (\$63,000), and increase in deferred income taxes (\$8,000). The uses, among the operating assets and operating liabilities, for Carson Products are: increase in accounts receivable, net (\$40,000), increase in inventory (\$50,000), and decrease in accrued liabilities (\$9,000). There is a nonoperating loss of \$2,000 from the sale of equipment that had a cost of \$20,000, accumulated depreciation of \$10,000, and a book value of \$10,000 that was sold for \$8,000. There is a nonoperating gain of \$10,000 from selling long-term investments that had a cost of \$20,000 for \$30,000. This leads to cash flow from operations of \$18,000, as shown in the following summary calculation. Also, see Table 5, which illustrates the indirect method for calculating cash provided from operations.

$$\text{CFO} = \text{NI} + \text{Depreciation} + \text{Sources} - \text{Uses} + \text{NOL} - \text{NOG}$$

$$\text{CFO} = 30,000 + 20,000 + 4,000 + 63,000 + 8,000 - 40,000 - 50,000 - 9,000 + 2,000 - 10,000 = \$18,000$$

Cash Flows from Investing and Financing Activities

The cash inflow from investing activities for Carson products equals the selling prices for the long-term investments (\$30,000) and equipment (\$8,000). The cash outflow for the purchase of plant and equipment can be determined using the following equation:

$$\text{P\&E}_1 + \text{Acquisitions of P\&E} - \text{Cost Basis of P\&E Sales} = \text{P\&E}_2.$$

Solving for the cash flow, in this case, *Acquisitions of P&E* yields

$$\begin{aligned} \text{Acquisitions of P\&E} &= \text{Cost Basis of P\&E Sales} + (\text{P\&E}_2 - \text{P\&E}_1) \\ &= \$20,000 + (\$430,000 - \$300,000) = \$150,000. \end{aligned}$$

Refer to Table 5. Since the depreciation expense was not listed separately in the income statement, it must be computed from the following accumulated depreciation equation,

$$\text{AD}_1 + \text{Depreciation Expense} - \text{AD for Asset Sales} = \text{AD}_2.$$

Solving this equation for depreciation yields

$$\text{Depreciation Expense} = \text{AD for Asset Sales} + (\text{AD}_2 - \text{AD}_1).$$

For Carson depreciation expense is

$$\$20,000 = \$10,000 + (\$60,000 - \$50,000).$$

The cash inflow from financing activities for Carson Products equals the sale of bonds (\$70,000) and the sale of common stock (\$20,000). Note that while the change in the common stock account of 36,000 is listed as a

source of 36,000, it must be adjusted for the use of 16,000 from the decrease in preferred stock resulting from the conversion of preferred stock into common stock. Since the conversion of the preferred into common did not require the use of cash, this transaction would not appear on the statement of cash flows. However, it is an important financing decision and is, therefore, reported in a supplemental schedule below the statement of cash flows. Thus, the cash flow from issuing common stock is equal to \$20,000 (= 36,000 – 16,000) and there was no cash flow generated from the decrease in preferred stock. The accounting equation for retained earnings is $RE_1 + NI - \text{Dividends Declared} = RE_2$. The source column in Table 3 shows a source for retained earnings of 21,000. However, that difference shows up on the cash flow statement not in this net amount but as a source of 30,000 (net income) and a use of 9,000 (dividends paid), which equals a net source of 21,000 (see Table 5.)

Table 5: Carson Products Statement of Cash Flows (Indirect Method) For the Year ended December 31, 2007

Operating activities:		
Net income		\$30,000
Adjustments needed to convert net income to a cash basis:		
Depreciation expense		20,000
Add sources:		
Decrease in prepaid expenses	\$4,000	
Increase in accounts payable	63,000	
Increase in deferred taxes	8,000	75,000
Subtract uses:		
Increase in accounts receivable	(\$40,000)	
Increase in inventory	(50,000)	
Decrease in accrued liabilities	(9,000)	(99,000)
Nonoperating gains and losses:		
Gain on sale of investments		(10,000)
Loss on sale of equipment		2,000
Net cash flow from operating activities		\$18,000
Investing activities:		
Cash was provided by:		
Sale of investments	\$30,000	
Sale of equipment	8,000	
Cash was used for:		
Purchase plant and equipment	(150,000)	
Net cash flow from investing activities		(\$112,000)
Financing activities:		
Cash was provided by:		
Issuance of bonds	\$70,000	
Sale of common stock	20,000	
Cash was used for:		
Payment of dividends	(9,000)	
Net cash flow from financing activities		\$81,000
Net change in cash		(\$13,000)
Supplemental schedule of noncash investing and financing activities:		
Preferred stock converted into common stock		\$16,000

This table presents the Carson statement of cash flows using the indirect method.

CONCLUSION

One of the most difficult topics for students to master in the initial MBA financial management course is the statement of cash flows. The goal of this paper is to present an alternative technique for student instruction in the creation of the cash flow statement based on financial equation relationships. The development of the cash flow statement using financial equations is a superior methodology to standard approaches used in most accounting and finance texts. By employing financial statement equations in preparing the statement of cash flows, students: (1) are employing tools that they are more familiar and comfortable with which mitigates their anxiety and enhances their understanding, (2) are better able to understand the logic of the statement of cash flows and the relationships that exist between it and the income statement and balance sheet, (3) obtain a better overall perspective of the firm's activities and a clearer understanding of how managerial decisions impact the

financial statements, and (4) are better prepared to integrate their new knowledge of financial statements into the remainder of the MBA curricular core. The cash flow statement is without question one of the key building blocks for the MBA curriculum. The body of this paper presents the financial equations for the balance sheet, the income statement and the cash flow statement with all of the financial relationships illustrated with equations. By working through the equations and without any reference to T-accounts, the student can follow through the development and presentation of the cash flow statement and understand how it is derived from the underlying financial statements.

MBA curricula have changed dramatically in the last two decades. These changes reflect not only the revolutionary transformations that have taken place within organizations and capital markets during this period, but also the theoretical advances developed by graduate schools of business. At the core of these changes is the development and integration of the concept of value creation into MBA curricula. Based on fundamental economic principles, value creation may be stated as follows: Any business decision — such as a new investment, the acquisition of another company, or a restructuring plan — will increase a firm's value only if the present value of the decision's expected future stream of net cash flows exceeds the initial cash outlay required to carry out the decision. Value creation is fundamental to a business's growth and survival. Moreover, the emphasis on value creation has increased the importance of being able to understand and forecast future cash flows in a more rigorous format. The financial equation approach to the cash flow statement as presented in this paper can be directly related to the valuation equations used in developing the concepts of value creation. Thus, the financial statement equation approach provides the students with a single integrated set of financial equation relationships that starts with the basic financial statement equations and ends with the integration of the cash flow statement into the concept of value creation. The future direction of this approach is the development of a complete, integrated set of financial statement equations and applications starting with the financial statement equations and ending with the development of the present value of the future stream of cash flows.

REFERENCE

- American Institute of Certified Public Accountants. (2007). *Accounting Trends and Techniques*. New York: AICPA.
- American Institute of Certified Public Accountants – Accounting Principles Board (APB). (1963). *Opinion No. 3: The statement of source and application of funds*. New York: AICPA.
- American Institute of Certified Public Accountants – Accounting Principles Board (APB). (1963). *Opinion 19: Reporting changes in financial position*. New York: AICPA.
- Brealey, R. A., Myers, S. C., & Marcus, A. J. (2009). *Fundamentals of corporate finance (6th Ed.)*. New York: McGraw-Hill/Irwin.
- Ehrhardt, M. C. & Brigham, E. F. (2008). *Corporate finance: A focused approach (3rd Ed.)*. Mason, Ohio: Southwestern-Cengage.
- Financial Accounting Standards Board. (1987). *Statement of Financial Accounting Standard No. 95. Statement of Cash Flows*. Stamford, CT: FASB.
- Harrison, W. T., Horngren, C. T., & Thomas, C. W. (2010). *Financial accounting (8th Ed.)*. Upper Saddle River, NJ: Pearson Prentice Hall, Inc.
- Johnson, G. L. (1966). Funds-flow equations. *The Accounting Review*, 41, 510-517.

Kimmel, P. D., Weygandt, J. J., & Kieso, D. E. (2009). *Accounting: Tools for business decision making (3rd Ed.)*. Hoboken, NJ: John Wiley & Sons, Inc.

Needles, B. E. & Powers, M. (2008). *Principles of financial accounting (10th Ed.)*. Boston: Houghton Mifflin Company.

Phillips, F., Libby, R., & Libby, P. (2008). *Fundamentals of financial accounting (2nd Ed.)*. New York: McGraw-Hill/Irwin.

Ross, S. A., Westerfield, R. W., & Jordan, B. D. (2010). *Fundamentals of corporate finance (9th Ed.)*. New York: McGraw-Hill/Irwin.

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