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The Statement of Cash Flows[1]

Direct and Indirect Method

Fernando Peñalva
Marc Badia

Cash is extremely important and maintaining liquidity is essential to guaranteeing the survival of any firm. The vast majority of business failures occur because firms run out of cash. Sometimes the business model is sound, but the initial financing is not sufficient to keep the firm alive during the early years – in which cash outflows tend to be larger than cash inflows – until the firm establishes itself and sales pick up. For these reasons, users of financial information want to know how cash is generated and how cash is used every period. The information in the income statement (I/S) is not enough, since revenues and expenses do not coincide with cash inflows and outflows because of the accrual basis of accounting. Therefore, net profit does not coincide with the cash flow from operations. In addition, the firm may be investing in plant and equipment or repaying loans, items that do not generate expenses equal to the amounts paid.

To satisfy this informational need on the part of investors, firms prepare the Statement of Cash Flows, which shows how cash is generated and used during every period and classifies the different cash flows into three categories: cash from operations, cash from investments and cash from financing. This classification is based on the nature of the business cycle. Financing cash flows include capital contributions or withdrawals by owners, new borrowings, repayment of existing borrowings and payment of dividends. Investment cash flows include purchases or disposals of property, plant and equipment, purchases or sales of financial assets (i.e., shares of other firms, treasury bills, etc.) and purchases or disposals of other firms (i.e., mergers and acquisitions). The remaining cash flows are operating cash flows, which include collections from customers, payments to suppliers and employees, payments to tax authorities and payments for operating expenses (i.e., rent, insurance, utilities, etc.). Interest paid or received and dividends received from financial investments are usually classified as operating cash flows.

To understand the preparation of the statement of cash flows, we are going to use a real-life example. Below you are given a summary of the movements in the cash account of ABC Company, a merchandising firm based in Europe, during year two (amounts in € million). We just need to group the different cash flows into the three categories. Next to each cash flow, we

[1] It is highly advisable to read first note CN-230-E to further understand this note.

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have written its nature using the letters O, I, or F to indicate operations, investing or financing, respectively.

	Cash		
BB	72		
(O) Collections from customers	1,191	782	Payments to suppliers (O)
(I) Sale of PPE*	5	280	Salaries paid (O)
(F) New share capital	15	14	Interest paid (O)
		22	Taxes paid (O)
		72	PPE* purchase (I)
		2	Land purchase (I)
		31	Loan repayment (F)
		10	Dividends paid (F)
EB	70		

* PPE stands for property, plant and equipment.

The usual presentation of the statement of cash flows is as follows:

ABC Company Statement of Cash Flows for Year 2 (in € million) (Direct method)	
Operating activities	
Collections from customers	1,191
Payments to suppliers	–782
Payments to employees	–280
Payments for interest	–14
Payments for taxes	–22
Cash flow from operating activities (CFO)	**93**
Investment activities	
Land purchase	–2
Purchase of PPE	–72
Sale of PPE	5
Cash flow from (used in) investing activities (CFI)	**–69**
Financing activities	
Loan payment	–31
New share capital	15
Dividends paid	–10
Cash flow from (used in) financing activities (CFF)	**–26**
Change in cash (CFO+CFI+CFF)	**–2**
Cash, beginning balance	72
Change in cash during year 2	–2
Cash, ending balance	70

This presentation of the statement of cash flows is fairly straightforward and intuitive. It is a simple list of cash collections and payments classified by their nature: operations, investing or financing. The sign convention is such that negative numbers indicate payments. This form of

deriving the cash flow from operations is known as the *direct method*. It just requires access to the movements in the cash account. Exhibit 1 contains the direct method statement of cash flows for KONE, a Finnish company.

Unfortunately, this simple method is not the one used by most firms when they report the cash flow from operations. There is an alternative way of deriving the cash from operations, when access to the cash account is not available. This method starts off with net profit and adjusts it to obtain the cash flow from operations. It is called the *indirect method* of deriving the cash flow from operations. It is more complicated and it is the subject of the next section. Obviously, both methods produce the same results.

Spreadsheet Approach for Preparing the Cash Flow Statement Using the Indirect Method

All companies report investing and financing cash flows as the difference between cash inflows and cash outflows. However, the vast majority of companies report the operating cash flow as the sum of reported net income plus/minus accrual adjustments. These accrual adjustments are operating revenues and expenses that have not yet had any cash impact in the period: revenues not yet collected or expenses not yet paid. *The idea is to reconcile net income to cash from operations.* This indirect way of deriving the cash flow from operations is the reason for its name: the indirect method. To satisfy your curiosity, you can see an example on page 9 of this note. Unfortunately, this method is usually a source of confusion for most novices to accounting. In the following paragraphs, we describe a simple framework to prepare the cash flow statement using the indirect method. This framework is extremely powerful and pedagogical because it forces you to understand the behavior of the balance sheet accounts; used systematically, it avoids practically all mistakes. Cash is always defined in broad terms: it includes cash and cash equivalents. The latter is cash invested in short-term highly liquid investments.

We start off with the basic accounting identity. Decomposing it, we observe the following:

$$\underbrace{\text{A}}_{\text{Cash + A*}} = \text{L + OE}$$

$$\text{Cash + A*} = \text{L + OE (A* stands for } \textit{Assets other than cash}\text{)}$$

Taking changes (Δ) and rearranging terms to isolate cash, we obtain:

$$\Delta\text{Cash} = -\Delta\text{A*} + \Delta\text{L} + \Delta\text{OE}$$

The above equation indicates that if we explain the change in liabilities, owners' equity and assets other than cash, we will explain the change in cash. This means that we can apply this idea to construct the cash flow statement. To do so, we will need two consecutive balance sheets and an income statement. Note that the change (Δ) in each account is defined as ending balance minus beginning balance (EB–BB).

Continuing with our example, the balance sheets, income statement and additional information for ABC Company are provided below. All sales are made on account.

ABC Company, Balance Sheets at Dec. 31 of (amounts in € million)	Year 2	Year 1
Assets		
Cash	70	72
Accounts receivable	102	93
Inventory	157	151
Land	32	30
PPE*, net of depreciation	336	330
Total assets	697	676
Liabilities		
Accounts payable	141	136
Interest payable	8	10
Loan payable	109	140
Owners' equity		
Contributed capital	265	250
Retained earnings	174	140
Total L & OE	697	676

ABC Company, Income Statement (amounts in € million)	Year 2
Sales revenue	1,200
COGS expense	–781
Salaries expense	–280
Depreciation expense	–54
Loss on sale of PPE*	–7
Interest expense	–12
Tax expense	–22
Net income	44

Additional information:

a) ABC paid a dividend to its shareholders of 10.
b) PPE* with a net book value of 12 was sold for 5 in cash. New PPE* was acquired for 72.
c) Land was purchased for cash.
d) ABC issued new shares for cash.

The first step is to compute the changes in all the balance sheet accounts and introduce the amounts in the following worksheet. Hint: it is always a good idea to express property, plant and equipment (PPE) net of depreciation; it will greatly simplify your task. Notice that we follow the sign convention dictated by the equation at the top of the spreadsheet. This implies that *we must reverse the sign of the changes in assets other than cash.* In this way, when we add these changes to the changes in liabilities and owners' equity, we will obtain the change in cash.

ΔCash = − ΔAssets other than cash + ΔL + ΔOE
(sign convention: cash payments are negative numbers; cash collections are positive numbers)

(amounts in € million) **Cash Flow Statement of ABC Company for Year 2**

Balance sheet changes	Δ		CFO (net income +/− adjustments)	CFI (only cash flows)	CFF (only cash flows)
−Δ Accounts receivable	-9	=			
−Δ Inventory	-6	=			
−Δ Land	-2	=			
−Δ PPE, net of deprec.	-6	=			
+Δ Accounts payable	5	=			
+Δ Interest payable	-2	=			
+Δ Bank loan	-31	=			
+Δ Contributed capital	15	=			
+Δ Retained earnings	34	=			
+Δ Cash	-2	=	CFO ?	CFI ?	CFF ?

Now let's proceed line by line, explaining the change in each balance sheet account. We will write down the change in the appropriate column, depending on whether the change is due to operating, investing or financing activities. In the third (CFI) and fourth (CFF) columns, we are only allowed to write down the actual cash flows that caused the change (i.e., purchases of PPE, repayment of a loan, etc.). However, in the second column (CFO), we are allowed to write down non-cash changes (i.e., net income is a component of the change in retained earnings, but it is not cash; the change in A/R is a component of revenues not yet collected in cash, etc.). In some cases, the change in a specific account is due, for example, to operating and financing activities; therefore, we will record the two components of the change in the appropriate columns.

Do not worry; this is easier than it looks. Let's apply this method to the example at hand. We are going to proceed systematically, account by account. We will begin from the bottom for reasons that will become clear in the next paragraphs. Nevertheless, the order followed is irrelevant.

1) The change in retained earnings is due to net income earned in the period and to dividends paid. ABC paid a dividend of 10, so we record –10 in the CFF column because this is a financing activity. The other component of the change in retained earnings is net income of 44 (see the income statement). Net income is the result of operations, so we record it in the CFO column. In addition, net income is not cash, so we cannot record it in any other column. Notice that 44 – 10 = 34, so we have explained the change in retained earnings correctly.

2) The change in contributed capital is due to an issue of new shares for cash of 15. This is a financing activity; thus, we record 15 in the CFF column.

3) The change in bank loan is –31. The cause is a repayment of part of the principal of the loan to the bank. This is a financing activity and we record –31 in the CFF column.

4) The change in interest payable (Interest/P) is due to interest expense being less than the interest paid. By convention, firms usually consider interest payments as an operating activity. Therefore, we must record –2 in the CFO column. Notice that net income was reduced by the interest expense; however, the interest paid was higher than the expense by 2 (for this reason, interest payable declined by 2). See the T-account below to understand this:

	Interest/P		
		10	BB
Interest paid	14	12	Interest expense
		8	

5) The change in accounts payable (A/P) is due to operating activities, so we record 5 in the CFO column.

Now we proceed to explain the change in assets other than cash. Recall that we must alter the sign of the changes as per the equation: ΔCash = **–** ΔAssets other than cash + ΔL + ΔOE.

6) The change in net property, plant and equipment (PPE) is always caused by four items: a) depreciation recognized in the period, b) purchase of new PPE, c) disposals of used PPE, and d) gains or losses incurred on the disposals. Only b) and c) involve cash. Occasionally, purchases or disposals could be zero. Because this case is slightly more complicated, let's analyze it in more detail using a T-account that contains all the movements recorded in this account: the purchase of new PPE, the disposal of used PPE, and the depreciation recognized in the period.

PPE, net			
BB	330		
PPE purchase (cash)	72	54	Depreciation of yr. 2 (not cash)
		12	BV of PPE sold (not cash)
EB	336		

The depreciation of 54 (see the income statement) reduces net PPE. The additional information provided reveals that ABC acquired new PPE worth 72 for cash and that the book value of the PPE sold was 12. Recall that the book value (BV) of the PPE sold is the original cost less the accumulated depreciation up to the time of the sale. Posting this information to the T-account, we obtain the correct ending balance. Now, let's transfer these amounts to our table of changes. First, we record the depreciation; it is an operating activity that does not consume cash (i.e., depreciation reduces the value of the PPE, but it does not imply a payment). Therefore, we write down 54 in the CFO column to adjust net income upwards. Second, we record –72 in the CFI column because the purchase of new PPE is an investment activity that required a cash payment of that amount. Finally, the disposal of used PPE generated a cash inflow of 5 (see additional information). In the income statement, we can observe that ABC recorded a loss on disposal of 7. The question is where to record these figures in our spreadsheet. Note that the effect of the disposal on the T-account is 12. Does this mean that ABC received 12 in cash as a result of the disposal? You already know that this is not the case. ABC only received 5 for used PPE with a book value of 12. This means that ABC incurred a loss of 7 in this transaction. We can decompose 12 into 5 (cash received) and 7 (loss incurred).[2] We can substitute this information into the T-account, for algebraic purposes, as follows:

PPE, net			
BB	330		
PPE purchase (cash)	72	54	Depreciation of yr. 2 (not cash)
		5	Cash from PPE sold
		7	Loss on sale of PPE
EB	336		

Following our convention, we record 5 in the CFI column because ABC obtained 5 in cash from disposing of used PPE. Next, we record the loss of 7 in the CFO column. Notice that net income was reduced by this loss. However, this loss is due to a non-operating activity (i.e., this firm is not in the business of selling PPE) and we need to adjust net income by adding back 7. The reason is that the CFO column must eventually produce the cash flow from operations and we want to

[2] Gain/Loss on sale of used PPE (–7) = Selling price (5) – BV of PPE sold (12). The negative 7 indicates a loss. Isolating the BV of PPE sold on the left side of the equation, we obtain: BV of PPE sold (12) = Selling price (5) – Gain/Loss on sale of used PPE (–7).

remove any item from this column that is not related to operations, but that affected net income. Furthermore, the loss of 7 is already included in the 5 recorded in the CFI column, because ABC sold a piece of PPE with a book value of 12 for 5. If we do not adjust net income, we would be double counting this loss. Eventually, we are able to explain the change in net PPE as follows: –6 = 54 (depreciation) – 72 (purchase of PPE) + 5 (cash from sold PPE) + 7 (non-operating loss).[3]

7) The change in land is due to an additional purchase of terrain. The payment was made in cash and this is an investment activity. So, we record –2 in the CFI column. This indicates that ABC purchased land, paying 2.

8) The change in inventories of –6 is also an operating activity, which is recorded in the CFO column.

9) The change in accounts receivable (A/R) is due to uncollected sales. It is the result of an operating activity, so we write down –9 in the CFO column.

Now, let's examine the status of our spreadsheet. You can see that by adding the numbers in the columns we obtain the cash from operating, investing and financing activities, as well as the total change in cash:

ΔCash = − ΔAssets other than cash + ΔL + ΔOE
(sign convention: cash payments are negative numbers; cash collections are positive numbers)

(amounts in € million) **Cash Flow Statement of ABC Company for Year 2**

Balance sheet changes	Δ		CFO (net income +/− adjustments)		CFI (only cash flows)		CFF (only cash flows)	
−Δ Accounts receivable	-9	=	-ΔA/R	-9				
−Δ Iventory	-6	=	-Δ Inventory	-6				
−Δ Land	-2	=			Land purchase	-2		
−Δ PPE, net of deprec.	-6	=	+ Depreciation	54	Purchase of PPE	-72		
			+ Los son PPE	7	Sale of PPE	5		
+Δ Accounts payable	5	=	+ Δ A/P	5				
+Δ Interest payable	-2	=	+ Δ Interest/P	-2				
+Δ Bank loan	-31	=					Loan repayment	-31
+Δ Contributed capital	15	=					New equity	15
+Δ Retained earnings	34	=	Net income	44			Dividends paid	-10
+Δ Cash	-2	=	CFO	93	CFI	-69	CFF	-26

The CFO column shows how net income (44) is adjusted to convert this non-cash figure into a cash amount (93). That is, we have adjusted net income to derive the cash flow from operations. The CFI and CFF columns already contain a list of cash inflows and outflows that detail the components of each flow. If you rearrange the different line items from the table above, you will get the indirect method cash flow statement shown below. Note that the investing and financing sections are presented like in the direct method cash flow statement on page 2. The indirect

[3] If the firm had incurred a non-operating gain, the adjustment would have been to subtract the gain.

method is the presentation used by the majority of firms. Actually, the indirect method is the mandatory presentation under IFRS and US GAAP. The direct method is optional. However, firms that use it must also report the indirect method. See an example in Exhibit 1.

ABC Company cash flow statement for year 2 (in € million) (indirect method)	
Operating activities	
Net income	44
+ Depreciation	54
+ Loss on sale of PPE	7
- Δ Accounts receivable	-9
- Δ Inventory	-6
+Δ Accounts payable	5
+Δ Interest payable	-2
Cash flow from operating activities (CFO)	**93**
Investment activities	
Land purchase	-2
Purchase of PPE	-72
Sale of PPE	5
Cash flow from investing activities (CFI)	**-69**
Financing activities	
Loan payment	-31
New equity	15
Dividends paid	-10
Cash flow from financing activities (CFF)	**-26**
Change in cash (CFO+CFI+CFF)	**-2**
Cash, beginning balance	72
Change in cash during year 2	-2
Cash, ending balance	70

In Exhibit 2 at the end of this note, we include a detailed explanation for each of the adjustments to net income. Note that the cash flow from operations consists of these components:

CFO = Net income + Depreciation + Non-operating losses – Non-operating gains – Δ Operating assets other than cash + Δ Operating liabilities

Some firms report an item called *free cash flow*. It is defined as the cash flow from operations less capital expenditures. The latter are the net cash investments in property, plant and equipment. Capital expenditures are informally referred to as "capex." Free cash flow is the measure of a firm's ability to generate the cash necessary to maintain its operations. Free cash flow is widely used by analysts and the financial press. In the above example, the free cash flow of ABC Company is 24 (= 93 – 69).

Most likely, you found the indirect method difficult and obscure. In addition, perhaps our explanation was not clear enough. Take courage because all first time preparers of an indirect method cash flow statement feel like you do. Experience shows that if you practice several times, eventually you will end up feeling fairly comfortable with the indirect method. Good luck!

Exhibit 1

KONE. Statement of Cash Flows

In millions of euros	2013	2012
Direct method to obtain cash flow from operations		
Cash receipts from customers	446.01	373.61
Cash receipts from other operative income	12.34	9.06
Cash paid to suppliers and employees	-300.71	-247.66
Financial items (interest and dividends received, interest paid and other)	272.40	295.72
Taxes and other items	-28.39	-21.66
Cash flow from operating activities (CFO)	401.65	409.07
Capital expenditure	-14.03	-16.24
Proceeds from sales of fixed assets	0.00	0.13
Subsidiary investments	-372.07	-224.91
Proceeds from sales of subsidiary shares	0.00	382.27
Cash flow from investing activities (CFI)	-386.10	141.25
Purchase of own shares	-62.88	-36.86
Increase in equity (option rights)	24.40	29.70
Net change in short-term debt	489.12	-278.10
Net change in long-term debt	360.26	28.47
Profit distribution	-781.20	-740.82
Group contributions received	33.78	40.26
Other financing items	32.23	128.78
Cash flow from financing activities (CFF)	95.71	-828.57
Change in cash and cash equivalents (CFO + CFI + CFF)	111.27	-278.25
Cash and cash equivalents, Jan. 1	40.78	319.04
Change in cash and cash equivalents	111.27	-278.25
Cash and cash equivalents, Dec. 31	152.05	40.78

Reconciliation of net income to the cash flow from operating activities

In millions of euros	2013	2012
Indirect method to obtain cash flow from operations		
Profit for the financial year	429.46	459.32
Depreciations	11.75	10.30
Other adjustments	-41.04	-32.03
Change in working capital		
Change in receivables	-36.04	-17.02
Change in payables	37.53	-11.51
Cash flow from operating activities (CFO)	401.65	409.07

Source: KONE Annual Report.

Exhibit 2

Explanation of the Different Adjustments to Net Income to Derive CFO

The indirect method adjusts net income to derive cash flow from operations. Net income is the result of revenues minus expenses. Some revenues and expenses are not cash and we need to adjust them in order to obtain the actual cash flows.

The *sales revenue* of 1,200 was not the cash collected, because ABC's sales are on account. We need to obtain how much cash was received from customers. The answer is in the accounts/R account:

Accounts/R			
BB	93		
Credit sales (from I/S)	1,200	1,191	Cash collections
EB	102		

From the balance sheet, we know the beginning and ending balances for accounts/R. From the income statement (I/S), we obtain the sales revenue. We can put this information into the T-account to derive the cash collections: BB (93) + Credit sales (1,200) – Cash collections (?) = EB (102). Solving the equation, we get that cash collections amounted to 1,191. Note that the difference between sales revenue and cash collections equals the change in accounts receivable: 1,200 – 1,191 = 9. Therefore, to adjust sales revenue, we subtract 9 (–Δ A/R) and we obtain cash collections. You can see the adjustment in Appendix 1 below.

The *COGS expense* is not the cash paid to suppliers of merchandise sold. To derive this amount, we need to use two T-accounts: inventory and accounts/P:

Inventory			
BB	151		
Inventory purchases	787	781	COGS expense (from I/S)
EB	157		

Accounts/P			
		136	BB
Payment to suppliers	782	787	Inventory purchases
		141	EB

From the inventory T-account, we can obtain the amount of purchases of inventory: BB (151) + Inventory purchases (?) – COGS expense (781) = EB (157). This amount (787) is the value of the inventory purchased, but not the amount paid to the suppliers. To obtain the cash paid, we use accounts/P: BB (136) + Inventory purchases (787) – Payment to suppliers (?) = EB (141). The cash paid to suppliers is 782. Note that the COGS expense less the change in inventory plus the change in accounts payable produces the cash paid to suppliers, as shown in Appendix 1.

Exhibit 2 (Continued)

The *salary expense* coincides with the payment to employees because there is no salaries payable account on the balance sheet. Therefore, there is no need to adjust this expense.

The *depreciation expense* does not imply a cash payment. The adjustment consists in cancelling the expense by adding the depreciation back.

The *loss on sale of PPE* is a non-operating loss that reduces net income. Because our goal is to derive cash from operations, we remove the effect of this loss by adding it back.

The interest expense does not coincide with the interest paid. The difference between the expense (12) and the payment (14) is the change in the interest/P account (–2). For this reason, the adjustment to interest expense is to add back the change, as shown in Appendix 1.

	Interest/P		
		10	BB
Interest paid	14	12	Interest expense
		8	EB

Finally, the *tax expense* coincides with the payment for taxes because there is no tax payable account on the balance sheet. Therefore, there is no need to adjust this expense.

Appendix 1

ABC Company (Amounts in € Million)

	Year 2 Net income	Adjustments		Year 2 CFO	
Sales revenue	1,200	-9 (-Δ A/R)	=	1,191	Cash collections
COGS expense	-781	-6 (-Δ Invent) + 5 (+Δ A/P)	=	-782	Payments to suppliers
Salaries expense	-280	0	=	-280	Salaries paid
Deprec. expense	-54	54	=	0	Depr. Does not use cash
Loss on PPE sold	-7	7	=	0	Not an operating item
Interest expense	-12	-2 (+Δ Interest/P)	=	-14	Interest paid
Tax expense	-22	0	=	-22	Taxes paid
Net income	44	-9-6+5+54+7-2	=	93	Operating cash flow

Notice that the cash flows obtained in the last column of Appendix 1 coincide with those reported in the direct method statement of cash flows reported on page 2.

A final comment: as you may recall, working capital (WC) is defined as current assets less current liabilities. Some firms report the cash flow from operations as follows:

CFO = Net income + Depreciation + Non-operating losses – Non-operating gains – Δ Operating non-current assets other than cash + Δ Operating non-current liabilities – Δ WC

In the above expression, Δ WC means the change in operating current assets other than cash less operating current liabilities.