Cash Flow Analysis

15.511 Corporate Accounting
Summer 2004

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Massachusetts Institute of Technology

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Statement of Cash Flows

- Reports operating cash flow as well as other cash flow information.
- Provides important information to investors and creditors.
  - In particular, information about differences in the timing of revenue and expense recognition under GAAP and the associated cash inflows and outflows.
Statement of Cash Flows

- The cash flow statement separates changes in cash into three categories:
  - operating cash flow
  - investing cash flow
  - financing cash flow.

- The statement sums to the actual change in cash during the year
  - The actual change refers to the difference between the beginning and ending cash balances reported on the balance sheet.
Why focus on a cash flow statement?

- Net income reported on the income statement provides an important measure of performance.

- However, in the absence of cash flow, income does not pay the bills.

- Interest and dividend payments, required principal reductions on debt, and capital expenditures for plant and equipment and for expansion cannot be made without cash.

- Cash provided by operating activities, also known as operating cash flow, is a primary source of cash to meet these needs.
Why focus on a cash flow statement?

- In the absence of operating cash flow, cash from other sources can be used to cover cash requirements.

- For example, cash can be obtained from on-hand balances or nonrecurring asset sales, new debt or equity financing.

- These non-operating sources of cash flow can be relied upon only in the short run.

- In the long run, operating cash flow is the only reliable source of cash available to meet recurring needs.
1. Emily’s Bakery
Emily contributes $10,000 in cash

- Assets = Liabilities + Owners’ Equity

- Cash

- Contributed Capital

+$10,000

Journal Entry

<table>
<thead>
<tr>
<th>Dr</th>
<th>Cash</th>
<th>10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr</td>
<td>Contributed capital</td>
<td>10,000</td>
</tr>
</tbody>
</table>
2. The company borrows $3,000 from the bank

- Assets = Liabilities + Owners’ Equity

- Cash
- Loans Payable

- $3,000
- $3,000

Journal Entry

<table>
<thead>
<tr>
<th>Dr</th>
<th>Cash</th>
<th>3,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr</td>
<td>Loans payable</td>
<td>3,000</td>
</tr>
</tbody>
</table>
3. Company purchases equipment for $5,000 cash

- Assets = L + OE

- Cash  Equipment

- -$5,000  +$5,000

Journal Entry

<table>
<thead>
<tr>
<th>Dr</th>
<th>Equipment</th>
<th>5,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr</td>
<td>Cash</td>
<td>5,000</td>
</tr>
</tbody>
</table>
4. Company performs service for $12,000. The customer pays $8,000 in cash and promises to pay the balance at a later date.

- Assets = L + Owners’ Equity

- Cash Receivables Retained Earnings

- $8,000 $4,000 $12,000

Journal Entry

<table>
<thead>
<tr>
<th>Dr</th>
<th>Cash</th>
<th>8,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr</td>
<td>Accounts receivable</td>
<td>4,000</td>
</tr>
<tr>
<td>Cr</td>
<td>Retained earnings (Revenue)</td>
<td>12,000</td>
</tr>
</tbody>
</table>
5. Company pays $9,000 for expenses (wages, interest, and maintenance)

- Assets = Liabilities + Owners’ Equity

- Cash

- Retained Earnings

- -$9,000

- -$9,000

Journal Entry

Dr Retained Earnings (Expenses)  9,000
Cr  Cash  9,000
6. Company pays a dividend of $1,000

- Assets = Liabilities + Owners’ Equity

- Cash

  Dr Retained Earnings (Dividends) 1,000
  Cr Cash 1,000

  Journal Entry
## Transactions and the Accounting Equation

<table>
<thead>
<tr>
<th>Cash</th>
<th>A/R</th>
<th>Equip.</th>
<th>L/P</th>
<th>C. Cap.</th>
<th>R/E</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+10,000</td>
<td></td>
<td>+10,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3,000</td>
<td></td>
<td>+3,000</td>
<td>+10,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-5,000</td>
<td></td>
<td></td>
<td>+5,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+8,000</td>
<td>4,000</td>
<td>4,000</td>
<td>+12,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-9,000</td>
<td></td>
<td></td>
<td>-9,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1,000</td>
<td></td>
<td></td>
<td>-1,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6,000</td>
<td>4,000</td>
<td>5,000</td>
<td>3,000</td>
<td>10,000</td>
<td>+2,000</td>
</tr>
</tbody>
</table>

**Total:**

- Net Increase: $10,000
- Net Decrease: $9,000
- Net Change: $5,000
<table>
<thead>
<tr>
<th>Assets</th>
<th>Amount</th>
<th>Liabilities and Owners’ Equity</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>6,000</td>
<td>Loans Payable</td>
<td>3,000</td>
</tr>
<tr>
<td>Receivables</td>
<td>4,000</td>
<td>Contributed Capital</td>
<td>10,000</td>
</tr>
<tr>
<td>Equipment</td>
<td>5,000</td>
<td>Retained Earnings</td>
<td>2,000</td>
</tr>
<tr>
<td><strong>Total Assets</strong></td>
<td><strong>$15,000</strong></td>
<td><strong>Total Liabilities and Owners’ Equity</strong></td>
<td><strong>$15,000</strong></td>
</tr>
</tbody>
</table>
### Income Statement

For the year ended December 31, 1997

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenues:</strong> Fees earned for service</td>
<td>$12,000</td>
</tr>
<tr>
<td><strong>Expenses:</strong> Wages, interest, maintenance</td>
<td>$ 9,000</td>
</tr>
<tr>
<td><strong>Net income</strong></td>
<td>$ 3,000</td>
</tr>
</tbody>
</table>
Transactions and Accounting Equation

\[
\begin{align*}
\text{Cash} & + \text{A/R} + \text{Equip.} = \text{L/P} + \text{C. Cap.} + \text{R/E} \\
+10,000 & \quad + \quad +10,000 \\
+3,000 & \quad + \quad +3,000 \\
-5,000 & \quad + \quad +5,000 \\
+8,000 & \quad + \quad +4,000 \\
-9,000 & \quad - \quad -9,000 \\
-1,000 & \quad - \quad -1,000 \\
6,000 & \quad 4,000 \quad 5,000 \quad 3,000 \quad 10,000 \quad +2,000
\end{align*}
\]
# Statement of Cash Flows

For the year ended December 31, 1997

<table>
<thead>
<tr>
<th>Activity</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating activities:</strong></td>
<td></td>
</tr>
<tr>
<td>Sale of a service (4)</td>
<td>8,000</td>
</tr>
<tr>
<td>Payments for expenses (5)</td>
<td>(9,000)</td>
</tr>
<tr>
<td><strong>Net cash from operating activities</strong></td>
<td>(1,000)</td>
</tr>
<tr>
<td><strong>Investing activities:</strong></td>
<td></td>
</tr>
<tr>
<td>Purchase of equipment (3)</td>
<td>(5,000)</td>
</tr>
<tr>
<td><strong>Net cash from investing activities</strong></td>
<td>(5,000)</td>
</tr>
<tr>
<td><strong>Financing activities:</strong></td>
<td></td>
</tr>
<tr>
<td>Borrowings (2)</td>
<td>3,000</td>
</tr>
<tr>
<td>Owner contributions (1)</td>
<td>10,000</td>
</tr>
<tr>
<td>Payment of dividends (6)</td>
<td>(1,000)</td>
</tr>
<tr>
<td><strong>Increase in cash balance</strong></td>
<td>6,000</td>
</tr>
<tr>
<td>Cash balance at the beginning of the year</td>
<td>0</td>
</tr>
<tr>
<td>Cash balance at the end of the year</td>
<td>6,000</td>
</tr>
</tbody>
</table>
Indirect versus Direct Cash Flow Formats

• Affects only the operating section of the cash flow statement

• Direct Cash Flow Statement
  Sale of a service (4)  8,000
  (-) Payments for expenses (5)  (9,000)
  Net cash from operating activities  (1,000)

• Indirect Cash Flow Statement
  Net Income  3,000
  (-) Sales to customer on account  (4,000)
  Net cash from operating activities  (1,000)
Cash flow statement

- In general, differences between net income and CFO (cash flow from operations) are captured in **operating** current asset and **operating** current liability accounts.
- Think accrued salaries expense: If employees have not been paid for the last three days of the year, the journal entry made to recognize salaries expense is:
  
  \[
  \text{Dr Wage Expense (-RE)} \quad 4,000 \\
  \text{Cr Wages Payable (+L)} \quad 4,000 
  \]
- Thus, to arrive at CFO, adjustments that need to be made to Net Income:
  - Subtract net increase in **operating** current assets other than cash itself.
  - Add net increase in **operating** current liabilities.
Indirect cash flow statement - depreciation

- What about depreciation?
- Net Income = Revenues – Depreciation expenses – Other expenses

- What is the cash consequence of recording depreciation expense?
- How are depreciation expenses recorded? Quick tutorial!
- Say, buy PP&E for $10 million at the beginning of Year 1
- Estimated life is 10 years
- Estimated scrap value after 10 years: 0
- Depreciation method: straight line
- Depreciation expense every year: $(10 million / 10) = $1 million
Quick tutorial on depreciation – contd.

- To record depreciation
  \[ \text{Dr Depreciation (-RE)} \quad \text{\$1 MM} \]
  \[ \text{Cr Accum. Depreciation (+XA)} \quad \text{\$1 MM} \]

- Accumulated depreciation is a contra-asset account attached to long-term depreciable assets (like PP&E)

- At the end of one year, on balance sheet
  - Gross value of PP&E: \(10\) million
  - Less: accumulated depreciation: \(1\) million
  - Net PP&E: \(9\) million

- Therefore:
  1. Depreciation expense affects Net income (negatively).
  2. The cash effect is zero
  3. The difference is in the Accumulated Depreciation account, NOT an operating current asset or an operating current liability
To arrive at CFO from net income

- **Start with Net Income**
  - *Add* depreciation expense
  - *Subtract* increases in *operating* non-cash current assets
  - *Add* increases in *operating* current liabilities

- **Arrive at CFO**
To arrive at CFO from net income

- Start with Net Income
  - Add depreciation expense
  - Add any other non-cash (or accrued) expense that does not affect operating current assets or current liabilities
  - Subtract increases in operating non-cash current assets
  - Add increases in operating current liabilities
- Arrive at CFO
- Some gray areas
  - What do you do with interest expense?
  - Where are dividends recorded in the cash flow statement?
  - What do you do with marketable securities? (usually recorded as current assets on the balance sheet)
Cash Flow Statement: Indirect-Method

Scientific Technologies, Inc.
Year Ending December 31, 2003

<table>
<thead>
<tr>
<th>Cash flows from operating activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net income</td>
</tr>
<tr>
<td>Adjustments to reconcile net income</td>
</tr>
<tr>
<td>Depreciation and amortization</td>
</tr>
<tr>
<td>Changes in assets and liabilities</td>
</tr>
<tr>
<td>A/R, net</td>
</tr>
<tr>
<td>Inventories</td>
</tr>
<tr>
<td>Receivable from parent company</td>
</tr>
<tr>
<td>Trade accounts payable</td>
</tr>
<tr>
<td>Accrued expenses</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

Cash flows from operating activities 3,379

Cash Flow Statement: Indirect-Method

**Cash flows from investing activities**

Property and equipment (1,041)
Sale (purchase) of S-T investments 809
Cash flows from investing activities (232)

**Cash flows from financing activities**

Payments on debt (50)
Reissuance of treasury stock 4
Dividends (957)
Cash flows from financing activities (1,003)

Change in cash and cash equivalent 2,144
Cash and cash equivalent at beginning of year 103
Cash and cash equivalent at end of year 2,247

# Cash Flow Statement: Direct Method

Scientific Technologies, Inc.  
Year Ending December 31, 2003

<table>
<thead>
<tr>
<th>Cash flows from operating activities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash received from customers</td>
<td>$24,274</td>
</tr>
<tr>
<td>Interest received and other cash income</td>
<td>685</td>
</tr>
<tr>
<td>Cash paid to suppliers and employees</td>
<td>(19,107)</td>
</tr>
<tr>
<td>Income taxes paid</td>
<td>(2,446)</td>
</tr>
<tr>
<td>Interest paid</td>
<td>(7)</td>
</tr>
<tr>
<td><strong>Cash flows from operating activities</strong></td>
<td><strong>$3,379</strong></td>
</tr>
</tbody>
</table>

### Net Income And Positive Operating Cash Flow
### A Mature firm

**American Consumer Product, Inc.**

**Years Ending December 31, 1990-1994**

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
<th>Net Income</th>
<th>Cash Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>$92,911</td>
<td>1,240</td>
<td>2,646</td>
</tr>
<tr>
<td>1991</td>
<td>$95,361</td>
<td>517</td>
<td>2,293</td>
</tr>
<tr>
<td>1992</td>
<td>$99,189</td>
<td>1,217</td>
<td>2,659</td>
</tr>
<tr>
<td>1993</td>
<td>$102,734</td>
<td>317</td>
<td>2,108</td>
</tr>
<tr>
<td>1994</td>
<td>$106,748</td>
<td>421</td>
<td>4,053</td>
</tr>
</tbody>
</table>

Note: thousands of dollars


## A. T. Cross Co.: A Firm in Decline

### Declining Net Income And Positive Operating Cash Flow

A.T. Cross, Inc.
Years Ending December 31, 1990-1994

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>$209,633</td>
<td>$205,248</td>
<td>$187,130</td>
<td>$164,606</td>
<td>$177,136</td>
</tr>
<tr>
<td>Net income from continuing operations</td>
<td>27,223</td>
<td>21,187</td>
<td>12,773</td>
<td>519</td>
<td>10,534</td>
</tr>
<tr>
<td>Cash provided in operating activities</td>
<td>32,767</td>
<td>26,304</td>
<td>26,396</td>
<td>24,940</td>
<td>26,851</td>
</tr>
</tbody>
</table>

Note: thousands of dollars

Summary

- A CF statement summarizes
  - the sources and uses of cash
  - Operating cash flows are needed for the long-term survival of a corporation
    - Future investments are paid for through operating cash flows in the long run
  - In the initial stages of a firm’s life
    - Financing cash flows are positive
    - Investing cash flows are negative
  - One can infer a firm’s prospects from a firm’s investing activity
    - High investments (meaning negative investing cash flows) suggest management anticipates growth
  - Preparation of a cash flow statement can be difficult!
    - Details below for your reference
Preparing a cash flow statement

- CF from Operating activities
  - Net Income
    - Adjust for Non-Cash Changes in Current Accounts
      - Subtract increase in net accounts receivable
      - Subtract increase in inventory
      - Subtract increase in prepaid expenses
      - Add increase in accounts payable
      - Add increase in miscellaneous expenses payable
      - Add increase in taxes payable
Preparing a cash flow statement

- CF from Operating activities
  - Net Income
    - Adjust for Non-Cash Changes in Current Accounts
    - Adjust for Non-Cash Changes in Non-Current Accounts
      - Add Depreciation & Amortization
      - Add Loss on Sale of Assets
      - Subtract Gain on Sales of Assets
Preparing a cash flow statement

- CF from Operating activities
- CF from Investing activities
  - Add cash received from
    - Sale of Investments
    - Sales of PP&E
  - Less cash paid for
    - Acquisition of Investments
    - Acquisition of PP&E
- CF from Financing activities
  - Add cash from
    - Add cash from
      - Debt issues
      - Capital stock issues
  - Less cash paid for
    - Debt repayment
    - Dividends
    - Repurchase of stock