

LINKS Tutorial #3: Balance Sheets

Katrina A. Zalatan & Randall G. Chapman

In LINKS, you receive several financial reports after every simulation round. This tutorial introduces you to the Balance Sheet. **Since balance sheets are derived from P&L statements and inventory reports, we recommend that you complete LINKS Tutorials #1 and #2 before you start this one.**

This tutorial is organized into four parts:

Starts On Page:

<u>PART 1: Overview</u>		2	
<u>PART 2: Assets</u>		3	
Exercise:	Question:	Topic: Page:	
1	1	Assets definition	3
	2	Asset size	3
	3	Inventory assets	3
<u>PART 3: Liabilities and Equities</u>		5	
Exercise:	Question:	Topic: Page:	
2	1	Liabilities	6
	2	Equities	6
	3 & 4	Profit utilization	6
	5	Balance sheet relationships	6
<u>PART 4: Links to the Performance Evaluation Report</u>		8	
Exercise:	Question:	Topic: Page:	
3	1	Return on assets (ROA) defined	8
	2	ROA versus Marketable Securities	8
	3	Firm ROA versus Industry Average	8
4	1	Net asset turnover defined	9
	2	Net asset turnover calculated	9

1. Overview

Each simulation round, you receive a Balance Sheet for your firm. This balance sheet shows the "balance" between your investments (Assets) and financing (Liabilities and Equities) for the round. Let's look at how the balance sheet is organized:

```

*****
FIRM 3: International Set Top Box, Inc.                INDUSTRY ABZ
BALANCE SHEET, MONTH 15                               PAGE 6
*****
ASSETS
-----
Cash                                                    3,681,501
Marketable Securities                                  13,912,611
Finished Goods and Postponed Production Inventory:
  Plant & DC1: Product 3-0 ( 0 units @ .00/unit)         0
                Product 3-1 ( 2,523 units @ 172.28/unit) 434,652
                Product 3-2 ( 81 units @ 195.75/unit)   15,856
  DC2:          Product 3-0 ( 0 units @ .00/unit)         0
                Product 3-1 ( 2,485 units @ 192.58/unit) 478,550
                Product 3-2 ( 210 units @ 195.74/unit)   41,105
  DC3:          Product 3-0 ( 0 units @ .00/unit)         0
                Product 3-1 ( 2,280 units @ 156.61/unit) 357,063
                Product 3-2 ( 2,084 units @ 195.74/unit) 407,922
Plant Investment                                       50,000,000
Procurement Inventory:
  Plant & DC1: Alpha ( 0 units @ .00/unit)                0
                Beta ( 0 units @ .00/unit)                0
                Gamma ( 4,931 units @ 13.91/unit)         68,580
                Delta ( 9,069 units @ 15.78/unit)        143,067
  Epsilon ( 4,172 units @ 31.92/unit)                 133,184
  DC2:          Gamma ( 1,051 units @ 17.86/unit)        18,775
                Delta ( 481 units @ 20.00/unit)           9,618
                Epsilon ( 1,409 units @ 34.94/unit)       49,229
  DC3:          Gamma ( 471 units @ 12.24/unit)           5,767
                Delta ( 462 units @ 12.29/unit)           5,677
                Epsilon ( 63 units @ 35.00/unit)           2,205
Total Assets                                           69,765,362

LIABILITIES AND EQUITIES
-----
Corporate Capitalization                               60,000,000
Dividends, Current Month                             -437,837
Dividends, Cumulative Prior To This Month            -3,747,312
Loans                                                  0
Retained Earnings, Current Month                     1,459,459
Retained Earnings, Cumulative Prior To This Month    12,491,052
Total Liabilities and Equities                       69,765,362

Note: These epsilon components are on-order, for delivery next month:
Region 1: 32,500Ds      32,500Da
Region 2: 750Ds        750Da
Region 3: None

```

← The top part of the balance sheet always shows the firm's assets as of the end of the simulation round. Generally speaking, **assets** are the resources the firm has to generate revenue and profit in the future.

← This part of the balance sheet shows **liabilities and equities** -- how a firm's finances its operations.

← This last part of the Balance Sheet reports the future commitments for epsilon purchases (i.e., pending inbound epsilon orders),

Let's start exploring the balance sheet by looking at "assets" in more detail.

2. Assets

In LINKS, the assets listed on the balance sheet typically include:

```

*****
FIRM 3: International Set Top Box, Inc.                INDUSTRY ABZ
BALANCE SHEET, MONTH 15                             PAGE 6
*****

ASSETS
-----
Cash                                                    3,681,501
Marketable Securities                                13,912,611
Finished Goods and Postponed Production Inventory:
  Plant & DC1:  Product 3-0 ( 0 units @ .00/unit)      0
                Product 3-1 ( 2,523 units @ 172.28/unit) 434,652
                Product 3-2 ( 81 units @ 195.75/unit)   15,856
  DC2:         Product 3-0 ( 0 units @ .00/unit)      0
                Product 3-1 ( 2,485 units @ 192.58/unit) 478,550
                Product 3-2 ( 210 units @ 195.74/unit)   41,105
  DC3:         Product 3-0 ( 0 units @ .00/unit)      0
                Product 3-1 ( 2,280 units @ 156.61/unit) 357,063
                Product 3-2 ( 2,084 units @ 195.74/unit) 407,922
Plant Investment                                       50,000,000
Procurement Inventory:
  Plant & DC1:  Alpha ( 0 units @ .00/unit)            0
                Beta ( 0 units @ .00/unit)            0
                Gamma ( 4,931 units @ 13.91/unit)      68,580
                Delta ( 9,069 units @ 15.78/unit)     143,067
                Epsilon ( 4,172 units @ 31.92/unit)    133,184
  DC2:         Gamma ( 1,051 units @ 17.86/unit)      18,775
                Delta ( 481 units @ 20.00/unit)        9,618
                Epsilon ( 1,409 units @ 34.94/unit)    49,229
  DC3:         Gamma ( 471 units @ 12.24/unit)        5,767
                Delta ( 462 units @ 12.29/unit)        5,677
                Epsilon ( 63 units @ 35.00/unit)       2,205

Total Assets                                           69,765,362
    
```

Cash and marketable securities (invested excess cash), totals that are derived from the Cash Flow Analysis Report each round.

Ending inventories of finished goods and components on the Finished Goods Inventory Report and the Procurement Inventory Report each round.

EXERCISE #1: Assets

1. Asset Definition: Assets are:
 - a. Expenditures on resources during the last simulation round.
 - b. Resources to generate revenues in the next simulation round.
 - c. Resources used to generate revenues during the last simulation round.
 - d. a and c

2. Asset Size: What is the largest asset for the fictitious Firm 3 in the example Balance Sheet excerpt, above?

3. Inventory Assets: What percentage of Firm 3's total assets were comprised of finished goods and procurement inventories?

EXERCISE #1: ANSWERS

1. **b** -- The balance sheet shows ending balances of:
 - **Cash** that can be spent on products, marketing, distribution centers ... anything that can bring in future revenue (and eventually profit).
 - **Marketable securities** that will be converted to cash at the start of the next simulation round. If your firm can earn more than 0.5% per round (the LINKS interest rate for marketable securities) by investing this cash in the firm operations, you should do it to earn more profit for your firm in the next simulation round!
 - **Plant investment** that will be used to make more products (and more revenue when these products are sold) in the future.
 - **Inventories** that will be probably be sold for revenue during the next simulation round (assuming no reconfigurations).
2. Plant investment
3. $[(\$1,735,148 \text{ in finished goods}) + (\$436,102 \text{ in procurement})] / \$69,765,362 \approx 3.1\%$

Let's now explore the **Liabilities and Equity** part of the balance sheet.

3. Liabilities and Equity

Liabilities and equities are two ways that a firm can receive capital (cash) to fund its on-going operations. This financing is used to invest in assets (like plant and inventory) and to pay on-going operating expenses (like marketing budgets, CSR salaries, and distribution center operating costs).

In LINKS, **liabilities** are loans from creditors. You automatically receive a loan if your cash dips to below 5% of revenues in any simulation round. If you receive a loan, the loan amount would appear next to "Loans" on your balance sheet, and you'd pay an interest payment (recorded as negative non-operating income on your Corporate P&L Statement). Our example balance sheet shows that our fictitious Firm 3 has no loans this simulation round...

LIABILITIES AND EQUITIES	
Corporate Capitalization	60,000,000
Dividends, Current Month	-437,837
Dividends, Cumulative Prior To This Month	-3,747,312
Loans	0
Retained Earnings, Current Month	1,459,459
Retained Earnings, Cumulative Prior To This Month	12,491,052
Total Liabilities and Equities	69,765,362

Equities refer to financing your firm receives from issuing stock to the public. A person who owns one share of stock in your firm owns one share of your total assets and one share of the return these assets produce. The "return these assets produce" is tallied on the balance sheet each round as **retained earnings** (profit kept in the firm to finance future growth) and **dividends** (profit paid out to shareholders each round).

Let's look at Firm 3 as an example. Since Firm 3 has no loans, they are completely equity financed. Stockholders originally contributed \$60,000,000 to the firm. If we assume that 1,000,000 shares of stock were originally issued, that means that Firm 3 sold 1,000,000 shares at \$60 a piece to raise \$60,000,000 to get their operations started.

Since the time of their original "corporate capitalization" (when they raised \$60,000,000), Firm 3 has increased the value of their assets to \$69,765,362. That means that Firm 3's shareholders now have claims on a larger asset, obviously good news for the shareholders. The actual dollar value of each share of Firm 3's stock, however, may be greater or less than 1/1,000,000 of their total assets (\approx \$69/share) because stock prices also value the *future* expected earnings of the firm relative to all other firms in the marketplace. So, if the stock market thought that Firm 3 was on the road to great profitability growth in future, their stock price would probably be much greater than the \$69/share you'd expect from their balance sheet.

If Firm 3 did have loan financing, creditors would have the first claim on their assets, up to the value of the loans owed. Shareholders would then have claims on the remaining assets of the firm.

EXERCISE #2: Liabilities and Equities

1. Liabilities: In LINKS, "liabilities" recorded on the balance sheet are:
 - a. Corporate capitalization
 - b. Dividends
 - c. Loans
 - d. a and b
 - e. b and c

2. Equities: Equities refer to:
 - a. Claims on the firm's liabilities.
 - b. Claims on the firm's assets.
 - c. Claims on the returns assets produce.
 - d. Claims on the returns liabilities produce.
 - e. b and c
 - f. All of the above

3. Profit Utilization: Net income paid out to shareholders each simulation round is:
 - a. Corporate capitalization
 - b. Dividends
 - c. Loans
 - d. Retained earnings

4. Profit Utilization: Net income kept within the firm to fund future operations and growth is:
 - a. Corporate capitalization
 - b. Dividends
 - c. Loans
 - d. Retained earnings

5. Balance Sheet Relationships: On the example balance sheet on page 2, you can see that "Total Assets" and "Total Liabilities and Equities" *each* equal \$69,765,362. Why is it that $\text{assets} = (\text{liabilities} + \text{equity})$?

EXERCISE #2: ANSWERS

1. c
2. e
3. b
4. d
5. $\text{Assets} = \text{Liabilities} + \text{Equities}$ because each side of the equation looks at the same dollars in a different way. **Assets** are dollars being invested and used in the firm, whereas **liabilities and equities** are financing sources of these dollars and who has an interest in the firm.

Now let's explore how the balance sheet is "linked" to the Performance Evaluation Report.

4. Links to the Performance Evaluation Report

In every simulation round in LINKS, you receive a Performance Evaluation Report that summarizes your results via financial, operational, and customer metrics. This report is the very first page of each round's financial and operating reports. You learned about the first two financial metrics ("net income to revenues" and "change in net income to revenues") in LINKS Tutorial #1 since these metrics pertain directly to P&L statements. The other two financial metrics ("return on assets" and "net asset turns") are derived directly from the balance sheet. Let's review each, starting with return on assets or "ROA":

$$\text{ROA} = \text{Net Income} / \text{Total Assets}$$

So in the case of our fictitious Firm 3:

$$\text{ROA} = \frac{\$1,459,459 \text{ (the "bottom line" on their Corporate P\&L)}}{\$69,765,362 \text{ ("Total Assets" from their balance sheet)}}$$

$$\text{ROA} \approx 2.1\%$$

EXERCISE #3: Return on Assets

- ROA Defined: Firm 3's month 15 ROA of 2.1% means that:
 - 2.1% of Firm 3's assets were used in round 15 to generate net income.
 - 2.1% of Firm 3's net income was used to increase their assets in round 15.
 - For every dollar of assets used in round 15, Firm 3 earned roughly \$0.021 in net income.
 - For every dollar of net income earned in round 15, Firm 3 used roughly \$0.021 in assets.
- ROA versus Marketable Securities: In LINKS, a firm earns 0.5% each simulation round on "excess" cash invested in marketable securities. In round 15, Firm 3's return on assets was _____ the return they earned on their marketable securities alone:
 - Higher than
 - Lower than
 - The same as
- Firm ROA versus Industry Average: In round 15, the average ROA in industry Z was 3.8%. Firm 3 earned 2.1%. What should this indicate to Firm 3?

EXERCISE #3: ANSWERS

1. c
2. a ... At 2.1%, Firm 3's ROA was 1.6 percentage points above the rate of return paid on marketable securities (0.5%). In the next simulation round, if Firm 3 takes some of that cash *out* of marketable securities and invests it *in their own operations* to increase earnings, it may lead to better (higher) returns.
3. Other firms are better investments. Other firms are earning more net income per Ldollar of assets spent. Firm 3 should look into ways to increase their profitability.

The fourth financial metric on your Performance Evaluation Report is net asset turns:

$$\text{Net Asset Turns} = \text{Revenues}/(\text{Net Assets})$$

...where: Net Assets = Total Assets - Loans

So, in the case of our fictitious Firm 3:

$$\text{Net Assets} = \$69,765,362 - 0 = \$69,765,362$$

Therefore, if we assume a total revenue of \$16,216,211:

$$\text{Net Asset Turns} = \$16,216,211/\$69,765,362 = 0.232$$

Stated in annual terms:

$$0.232 \times 12 \text{ months} \approx \mathbf{2.8 \text{ net assets turns per year}}$$

EXERCISE #4: Net Asset Turns

1. Net Asset Turns Defined: (True or False) For any given level of net assets, it is more desirable to have lower net asset turns.
2. Net Asset Turns Calculated: On the Performance Evaluation Report, net asset turns reflects that round's (assuming that each simulation round is a "month"):
 - a. Revenue/Total Assets
 - b. (Revenue/Total Assets) x 12
 - c. Revenue/Net Assets
 - d. (Revenue/Net Assets) x 12

EXERCISE #4: ANSWERS

1. False. Higher net asset turns for a given level of assets indicates higher revenues generated from those assets. Higher revenues and higher net asset turns are better.
2. d

**Want to learn analyses that
YOU could use to assess
the profitability of various
decision options?**

The following advanced tutorials are available to help. Each provides "hands-on" problems that use real LINKS financial data to assess the profitability of:

5. Inventory or Emergency Production?
6. Reconfiguration
7. Distribution Alternatives
8. Postponed Production

These LINKS tutorials are available for download via the LINKS web site.