Home Heaters: A Holistic View of the Financial Statements

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ABSTRACT: In this case, two start-up companies in the same industry have identical economic transactions. Although both companies follow generally accepted accounting principles (GAAP), each manager makes different choices and estimates when applying GAAP. By preparing the financial statements, calculating ratios, and comparing and contrasting the two companies, students see how choices and estimates made by management affect the financial statements. They also see the challenge faced by users of financial information when trying to interpret the financial statements and compare companies. Students really experience an “aha!” moment while analyzing this case. The case refutes their commonly held assumptions that accounting always has a right answer and that financial statements represent the truth.

Keywords: accounting alternatives; accounting choices; accounting estimates; economic transactions; financial statements; financial ratios; financial statement analysis.

CASE

At the beginning of the year 20X1, two companies began operations to sell home heating units. Eads Heater, Inc. is located in Eads, Colorado, and Glenwood Heating, Inc. is in Glenwood Springs, Colorado. The companies operate under similar economic conditions and have identical operations during the year. However, each manager makes different accounting choices and estimates when applying generally accepted accounting principles (GAAP) in preparing the company’s financial statements.

PART A

First-Year Transactions

Both companies have completed identical transactions during the first year of operations, 20X1. The transactions for each company are listed:

1. On January 2, each company issued 3,200 shares of capital stock for $160,000 and commenced operations.
2. On January 2, each company borrowed $400,000 on a 20-year, 7 percent note payable. Interest plus $20,000 principal is due September 30 each year, beginning 20X1.

3. On January 3, each company purchased land and a building for $420,000. Both managers assigned $70,000 to the land and $350,000 to the building. Each company paid cash for the land and building.

4. On January 5, each company purchased delivery equipment at a cost of $80,000. Both purchases were made with cash.

5. Each company sells one model of home heating unit, and made the following credit purchases during the year. (You may record all the purchases in one transaction.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Number Of Units</th>
<th>Cost Per Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 10</td>
<td>40</td>
<td>$1,000</td>
</tr>
<tr>
<td>March 14</td>
<td>60</td>
<td>1,100</td>
</tr>
<tr>
<td>June 1</td>
<td>20</td>
<td>1,150</td>
</tr>
<tr>
<td>September 15</td>
<td>62</td>
<td>1,200</td>
</tr>
<tr>
<td>October 30</td>
<td>28</td>
<td>1,300</td>
</tr>
</tbody>
</table>

6. Each company sold 160 units for $398,500 during the year. All sales were on credit; 90 days, same as cash. You will just record the sales piece of this transaction for now. Management has not yet determined how inventory and cost of goods sold will be valued. Therefore, this year, management will use the periodic inventory system and record cost of goods sold at the end of the year (in Part B).

7. $299,100 was collected during the year on the sales described in Transaction 6 above.

8. $213,360 was paid on the purchases made in Transaction 5 above.

9. On September 30, the first $20,000 principal payment plus nine months’ interest was made on the note payable described in Transaction 2.

10. A total of $34,200 was paid for a variety of expenses, such as advertising, supplies, insurance, and wages. These expenses are recorded in an account called “other operating expenses.”

11. Dividends of $7.25 per share were paid to the stockholders on December 1.

12. Management made an adjusting entry to accrue three months’ interest on the note payable in Transactions 2 and 9 above.

**Requirement**

Record these 12 transactions for Eads’s and Glenwood’s first year of operations before going to Part B. Exhibit 1 contains a basic chart of accounts. Note: you will not use all accounts in this part of the case.

**PART B**

It is now December 31, and each manager must make several decisions.

1. Each manager must estimate the amount of accounts receivable that will probably not be collected. They make the following estimates:

   **Glenwood Heating, Inc.**: The manager estimates that 1 percent of ending accounts receivable will be uncollectible.

   **Eads Heaters, Inc.**: The manager estimates that 5 percent of ending accounts receivable will be uncollectible.
2. Neither manager recorded cost of goods sold at the time of sale. They have taken a physical inventory, and now must determine the values of cost of goods sold and ending inventory. They decide to use the following inventory methods:

   **Glenwood Heating, Inc.:** FIFO
   **Eads Heaters, Inc.:** LIFO

3. Both managers determine that the expected lives and salvage values of the building and equipment owned by each company are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Expected Life</th>
<th>Salvage Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>30 years</td>
<td>$50,000</td>
</tr>
<tr>
<td>Delivery Equipment</td>
<td>8 years</td>
<td>8,000</td>
</tr>
</tbody>
</table>

   It is now time to record depreciation expense for the year. The managers decide to use the following depreciation methods:
4. On January 5, 20X1, each company negotiated the use of a large piece of operating equipment. Both managers agreed to a $16,000 payment on December 31, 20X1, at which time they would decide the terms for using the equipment in the future. On December 31, when making the payment, the managers negotiated the following terms:

**Glenwood Heating, Inc.**

Although the owner of the equipment agreed to let Glenwood rent the equipment for $16,000 again next year, he would not guarantee that price past next year. Management decided to rent the equipment on a yearly basis and signed an agreement to rent it next year for $16,000.

- Rental payment December 31, 20X1: $16,000
- Rental payment due December 31, 20X2: $16,000

**Eads Heaters, Inc.**

The owner of the equipment and Eads management negotiated a capital lease agreement. The present value of the lease agreement is $92,000. The contract carried the following terms:

- Period of time: 8 years
- Interest rate: 8%
- Total payment (including principal and interest) due December 31 of each year: $16,000

The first two payments of $16,000 are to be allocated to interest and principal as follows (amounts are rounded to the nearest $10):

<table>
<thead>
<tr>
<th>Interest</th>
<th>Principal</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 31, 20X1</td>
<td>$7,360</td>
</tr>
<tr>
<td>December 31, 20X2</td>
<td>6,670</td>
</tr>
</tbody>
</table>

The manager decides to compute depreciation using straight-line depreciation with a life equal to the eight-year contract term and no salvage value.

5. Both managers are concerned about income taxes. They both realize that companies generally keep a second set of books for tax reporting purposes, but are not sure about the differences between income reported according to GAAP and income as defined by the tax authorities. They also realize that they need to make an estimated tax payment in order to avoid late payment penalties. Both managers talk to their CPAs and are told to pay 25 percent of their GAAP income to the IRS to help avoid late penalties. Thus, each manager
estimated a provision for income taxes of 25 percent of their GAAP income and made a payment for that amount to the IRS.

**Requirement**

Record the last five transactions at the end of the year, and prepare the following financial statements for each company for the current year:

- Multistep Income Statement (List all expense accounts separately on the income statement.)
- Statement of Changes in Stockholders’ Equity
- Classified Balance Sheet
- Statement of Cash Flows

**PART C**

The managers plan to meet at the end of the year and compare the results of their companies’ operations.

**Requirements**

- Analyze the financial statements of the two companies. Your analysis should include the key financial ratios listed in Exhibit 2. Because this was the first year of operations, for ratios that require average account balances (e.g., average total assets), use the year-end balances. The formulas for the ratios can be found in Exhibit 3.
- Compare and contrast the operations of the two companies. Hint: Your comparison should address the financial position and profitability of each company.

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**EXHIBIT 2**

**Home Heaters**

**Financial Ratios**

**Liquidity Ratios**
- Current ratio
- Acid-test ratio
- Accounts receivable turnover
- Days to collect receivables
- Inventory turnover
- Days to sell inventory
- Operating cycle

**Profitability Ratios**
- Gross profit margin
- Profit margin
- Return on assets (ROA)
- Return on owners’ equity (ROE)
- Earnings per share (EPS)

**Long-Term Solvency Ratios**
- Debt ratio
- Times interest earned
## EXHIBIT 3
### Home Heaters
Formulas for Financial Ratios

#### Panel 1: Liquidity or Short-Term, Debt-Paying-Ability Ratios

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Description</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current ratio</td>
<td>Indicator of ability of current assets to meet current liabilities</td>
<td>Current assets / Current liabilities</td>
</tr>
<tr>
<td>Acid-test (quick) ratio</td>
<td>Indicates immediate short-term liquidity</td>
<td>Cash + short – term investments + net receivables / Current liabilities</td>
</tr>
<tr>
<td>Accounts receivable turnover</td>
<td>Indicates liquidity of accounts receivable during the reporting period</td>
<td>Current liabilities / Net credit sales</td>
</tr>
<tr>
<td>Days to collect receivables</td>
<td>Indicates the average number of days taken to collect accounts receivable</td>
<td>365 days / Accounts receivable turnover</td>
</tr>
<tr>
<td>Inventory turnover</td>
<td>Indicates liquidity of inventory during the reporting period</td>
<td>Cost of goods sold / Average inventory / 365 days</td>
</tr>
<tr>
<td>Days to sell inventory</td>
<td>Indicates the average number of days it takes to sell the inventory</td>
<td>Days to sell inventory + days to collect receivables</td>
</tr>
<tr>
<td>Operating cycle</td>
<td>Indicates the average number of days between the purchase of inventory and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the collection of cash from the sale of inventory</td>
<td></td>
</tr>
</tbody>
</table>

#### Panel 2: Profitability Ratios

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Description</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit Margins:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross profit margin</td>
<td>Measures profit generated from sales after considering cost of goods sold</td>
<td>Sales – cost of goods sold / Sales</td>
</tr>
<tr>
<td>Profit margin</td>
<td>Measures overall profitability as a percentage of sales dollars</td>
<td>Net income / Sales</td>
</tr>
<tr>
<td>Return on assets (ROA)</td>
<td>Measures the overall efficiency in managing the assets and generating profits</td>
<td>Net income / Average total assets</td>
</tr>
<tr>
<td>Return on owners’ equity (ROE)</td>
<td>Measures the return on stockholder’s investment after interest is paid to creditors</td>
<td>Net income – preferred dividends / Average common stockholders’ equity</td>
</tr>
<tr>
<td>Earnings per share</td>
<td>Measures the return to common stockholders for each share owned</td>
<td></td>
</tr>
<tr>
<td>Debt ratio</td>
<td>Measures the portion of investment that is from debt; indicates leverage</td>
<td>Income from operations / Interest expense</td>
</tr>
<tr>
<td>Times interest earned</td>
<td>Indicates the ability of the company to meet its interest requirements</td>
<td></td>
</tr>
</tbody>
</table>

Claiborne and Wilcox

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CASE LEARNING OBJECTIVES AND IMPLEMENTATION GUIDELINES

Learning Objectives

The overall objective of this case is to help students understand the effects of management’s decisions on the financial statements of a company. The primary goal is to help students differentiate between operational differences and accounting differences in the appearance of the financial strength or weakness of a company. Students see how management’s estimates and choices in applying generally accepted accounting principles (GAAP) directly impact a company’s financial statements.

In this case, two start-up companies have identical transactions. Each company gives management complete autonomy in applying GAAP when preparing the company’s financial statements. First, students record the basic transactions for the year. These transactions are the same for each company. Next, students make adjusting entries, assuming the management of one company makes certain estimates and choices in applying GAAP, and the management of the other company makes other estimates and choices. The managers make different accounting choices or estimates in the measurement and recognition of accounts receivable, inventory, depreciation, and the right to use a piece of operating equipment. These decisions result in either a higher or lower profit (income statement), or a stronger financial position (balance sheet).

After making the adjusting entries, students prepare financial statements and calculate financial ratios. The financial ratios clearly demonstrate that two identical companies can appear very different as a result of management decisions regarding accounting alternatives and estimates, rather than as a result of actual operating differences.

Although the two companies had identical economic transactions during the year, have the same physical inventory and accounts receivable at the end of the year, and have the same future commitments for next year, because of their accounting choices and estimates, the reported assets, liabilities, net incomes, and sources and uses of cash are very different. It is an “aha!” moment when students see there is no “true income” or that accounting choices and estimates make the companies appear on paper to be in different financial positions when, other than cash on hand after paying income taxes, the companies are economically the same.

In introductory accounting classes, topics are often presented to students in isolation rather than from a holistic view. This case ties it all together and completes the picture by presenting the results of each management’s application of GAAP in terms of accounting choices and estimates. As part of the analysis, students observe the impact of these decisions on the balance sheet, income statement, statement of cash flow, and financial ratios of each company, and the implications to the users of financial statements.

The case facilitates learning at various levels of Bloom’s taxonomy (Bloom et al. 1956). In a typical introductory accounting course, students function at Bloom’s first level of learning. They learn to record transactions and may even memorize the process, but additional practice is required for comprehension of the concepts used. In this case, students record transactions for the first year of operation according to GAAP, and prepare financial statements from the recorded transactions. This requires comprehension and application of GAAP, the second and third levels of Bloom’s taxonomy: Students know what is being communicated and can use the material correctly (Bloom et al. 1956, 19–21). Biggs and Tang (2007) refer to this as acquiring functional knowledge, or knowledge that can be “put to work” and which provides “a platform for launching informed decision makers and performers into the workforce” (Biggs and Tang 2007, 136).

In Part C of this case, students are required to integrate the concepts and are challenged at the analysis level of Bloom’s taxonomy. Students analyze the companies and see, from a user’s perspective, what these companies look like. Specifically, students compare and contrast the financial statements of two companies that have identical economic transactions, but very different...
numbers on their financial statements. Finally, discussion of the limitations of financial statements allows for learning at the highest level of Bloom’s taxonomy, evaluation: evaluating the use of GAAP and their overall effectiveness in meeting the needs of financial statement users when comparing companies. An excellent feature of this case is the ability to adapt it to the level of learning appropriate to the course being taught. Individual instructors can enhance or simplify the discussion as needed.

Case Setting

Two companies launch operations at the beginning of the year and have identical economic transactions during the first year. However, given the autonomy to determine which of the generally accepted accounting principles to follow, the managers make different choices with regard to the application of GAAP and in the estimates used in that application. These management-made decisions have a significant impact on net income, the balance sheet, and the sources and uses of cash reported on the cash flow statement, thereby affecting the financial ratios of the company.

Although the case notes that both companies operate under similar economic conditions, the managers make different estimates of uncollectible accounts receivable: 1 percent versus 5 percent. One manager decides to use first-in, first-out (FIFO) to value inventory and cost of goods sold; the other manager decides to use last-in, first-out (LIFO). While both managers make the same estimate with respect to the expected life and salvage value of the building and delivery equipment, one manager decides to depreciate equipment using double-declining balance, and the other manager decides to depreciate equipment using straight-line. Finally, both companies use a piece of operating equipment this year and will use the same piece of equipment next year, at an annual cost of $16,000. However, one manager decides to rent the equipment on an annual basis; the other manager purchases the equipment under a lease agreement.

The manager of Glenwood Heating, Inc. estimates 1 percent of accounts receivable are uncollectible. He chooses to value inventory and cost of goods sold using FIFO. He determines that both the building and the equipment should be depreciated using straight-line depreciation, and he decides to rent on a yearly basis, rather than purchase, a piece of operating equipment.

In contrast, the manager of Eads Heaters, Inc. estimates and records uncollectible accounts receivable to be 5 percent of the ending accounts receivable balance. He values inventory using LIFO. Buildings are depreciated using straight-line depreciation, but the delivery equipment is depreciated using double-declining balance. And, finally, the manager of Eads decides to use a capital lease arrangement to purchase the piece of operating equipment.

Implementation Guidance

Five different instructors have effectively used a version of this case in class sizes of 20 to 50 students over the past several years. The case is easily adaptable to class size, as well as individual instructor needs and preferences. It has been used as an end-of-the-semester project and as an ongoing project throughout the semester. As an ongoing project, students can generally record the transactions in Part A after completing the first three or four chapters of a principles textbook in which the material is first introduced. As the semester progresses, students record the transactions in Part B as the material is taught. Near the end of the semester, students prepare the financial statements. Finally, at the end of the semester, students complete Part C. They calculate various ratios, analyze the financial position of each company, and compare and contrast the two companies.

1 Introductory textbooks may use slightly different terms when defining ratios. We provide definitions of the ratios so instructors can alert students to any possible differences in their textbook and the case.
The case lends itself to flexibility. Some introductory accounting texts have the statement of cash flows at the end of the semester. Although the statement of cash flows is the last requirement in Part B of the case, it can easily be assigned at the end of the semester with Part C.

The instructor can also decide if a discussion of income taxes is warranted. The final entry in Part B of the case (Part B, Decision 5) is a provision for income taxes. While a provision for income taxes is generally not covered in an introductory accounting class, this option provides several learning opportunities. Including the simple estimated tax payment results in different cash balances at the end of the year for the two companies. This provides the instructor an opportunity to discuss the importance of cash to the operations of a company. It also provides an opportunity to discuss the difference between cash and earnings, a concept that students sometimes overlook.

The provision for taxes also provides the opportunity to discuss how and why a company keeps “two sets of books.” The discussion can be at the level of detail the instructor chooses. Although some of the accounting choices made for GAAP result in no differences in taxable income for the two companies, i.e., the allowance for bad debt, some of the choices will result in different taxable income.

An instructor can also easily adapt the case to include different estimates. For example, the managers could estimate different expected lives or salvage values of the building and/or equipment. These different estimates will result in additional differences between the reported financial statements of the two companies.

In order to facilitate student learning, we give students the correct starting point for Parts B and C. We grade and post the solution to Part A before assigning Part B. Students then start with the posted solution to Part A when recording the transactions in Part B. Again, after Part B is complete, we post the solution so students can calculate the financial ratios, and compare and contrast the companies in Part C using the correct financial statements.

We have required students to work this case individually; we have also had students do the case in three-, four-, and five-person groups. Because Parts A and B facilitate comprehension and application, we like to require students to do Parts A and B individually. However, we found that when students do the financial statement analysis and company comparisons as a group, the conversation is enriched. Students working together, versus working individually, produce a more robust analysis of the impact of accounting choices and estimates on the financial statements and financial ratios of a company. As an individual, a student may see some of the implications, but students rarely identify all the implications. We find that even when working in groups, it is unusual for students in an introductory accounting class to synthesize all the implications of the choices made by the managers.

**Student Feedback**

This case has been an excellent learning tool for our students. Regardless of the class in which this case was used or the instructor using it, student feedback has always been consistent and positive. Although we did not do formal evaluations of the case, formal evaluations were conducted at the end of the course each time the case was used. When asked what might be eliminated or included in the course to improve the course overall, typical student responses have been: “leave the alternatives case,” “I learned more from the alternatives case than anything else the instructor did this semester,” or “The alternatives case helped me see how accounting works (or doesn’t work).” When Part C of the case was done individually, student comments included: “I would have

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2 An instructor can determine the appropriate group size given the size of the class. We found no significant difference in the performance of the three-, four-, or five-person groups. Of course, typical group issues, like free-riding, may need to be addressed in some groups.
liked to work the alternatives analysis as a group project. I think the discussion would have helped me see more of the connections,” and “AAC was a great case but I think the third part should not be an individual exercise. It would be better for students to talk about it.” No student has ever made a negative comment about the case or suggested eliminating the case from the course.

The case provides students an opportunity to see and understand the differences between recorded transactions and actual economic transactions. It gives them insight into the options available to companies for recording their transactions, irrespective of the actual transactions, and illustrates the ability of managers to impact the financial statements and manage earnings. They begin to see the role accounting plays in the economic decisions of a company, as well as the limitations of the financial statements from a user’s perspective.

When they see the holistic impact of accounting choices and estimates, they realize that financial statements are not always a readily transparent reflection of the actual financial position of a company. They have a greater appreciation for the need to read and understand the first footnote in the statements, which identifies significant accounting policies. However, they also see the difficulty encountered when analyzing a company or comparing two companies, even with knowledge of the accounting choices and estimates made by management.

TEACHING NOTES

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REFERENCES

