

Filling in the Gaps: An Excel Based Integration of Financial Performance and Condition

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INTRODUCTION

When teaching introductory financial management courses, professors operate under the assumption that students have gained, through prerequisite courses, a basic understanding of accounting concepts. In principles of accounting courses, however, it is rare to find a curriculum that guides students through financial reporting methodology; one that demonstrates to students how to complete the end-of-cycle closing, adjusting, and reversing entries that allow the hands-on construction of a firm's financial statements. Even if the process is diligently taught, students often do not satisfactorily understand and/or retain this material.

Providing students in financial management courses some basic understanding of the eventual effects of key transactions on the financial statements and common financial ratios helps to solidify an understanding of the integration of these concepts. To specifically address student shortcomings in comprehending this material without entirely re-teaching the accounting course, we have developed, using Visual Basic for Applications (VBA), an

Excel application that demonstrates how transactions affect a firm's summary statements. Stepping through the application's macro allows us to lead students through transactional effects one at a time. This application concentrates on transactions that address typical financial management discussion topics: borrowing using long term debt, purchasing fixed assets, and estimating the effects of fixed assets in terms of generating sales revenue (and eventually, profit). This application is used to supplement classroom lectures; we also record a narrated demonstration of the application and post the resulting video online to serve as a review.

Describing a sample company, the application specifies initial values for an income statement, balance sheet, performance (income statement), condition (balance sheet) and combined ratios, as well as the DuPont Analysis, since we believe that it is important to visualize the key components of the return on equity (ROE). Display areas are also included on the spreadsheet for revised financial statement and ratio values, as well as for factors such the tax rate, dividend payout ratio, debt levels, interest rates, and depreciation.

Exhibit 1. Full Application

The screenshot shows an Excel spreadsheet with the following data tables:

Income Statement			Balance Sheet					
	Original	Revised	Assets		Liabilities and Owner's Equity			
Sales Revenue	58,800.00	58,800.00						
Cash Operating Expenses			Current Asset	Original	Revised	Current Liabilities	Original	Revised
Variable Costs	45,864.00	45,864.00	Cash and Equivalents	12,569.00	12,569.00	Accounts Payable	15,223.00	15,223.00
Fixed Costs	7,250.00	7,250.00	Accounts Receivable	9,842.00	9,842.00	Accrued Wages and Taxes	4,373.00	4,373.00
EBITDA	5,686.00	5,686.00	Inventory	4,382.00	4,382.00	Notes Payable	3,843.00	3,843.00
Non-Cash Operating Expenses			Total Current Assets	26,793.00	26,793.00	Total Current Liabilities	23,439.00	23,439.00
Depreciation	2,250.00	2,250.00						
EBIT	3,436.00	3,436.00				Long-term Debt	10,421.00	10,421.00
Interest	625.26	625.26				Total Liabilities	33,860.00	33,860.00
EBT	2,810.74	2,810.74	Fixed Assets			Shareholder's Equity		
Taxes	899.44	899.44	Gross	30,000.00	30,000.00	Common stock	2,554.00	2,554.00
Net Income	1,911.30	1,911.30	Net	19,500.00	19,500.00	Retained earnings	9,879.00	9,879.00
Dividends	477.83	477.83	Total Assets	46,293.00	46,293.00	Total Shareholder's Equity	12,433.00	12,433.00
Addition to Retained Earnings	1,433.48	1,433.48				Total Shareholder Eq & Liabilities	46,293.00	46,293.00

Performance			Condition		
	Original	Revised		Original	Revised
Profit Margin (NI/Sales)	3.25%	3.25%	Debt Ratio (TL/TA)	73.14%	73.14%
Operating Margin (EBIT / Sales)	5.84%	5.84%	Debt / Equity Ratio (TL/TE)	2.72	2.72
TIE (EBIT / Interest)	5.50	5.50	Current Ratio (CA/CL)	1.14	1.14
EBITDA Coverage (EBITDA / Interest)	9.09	9.09	Quick Ratio (CA - Inv) / CL)	0.956	0.956
			Cash Ratio (Cash / CL)	0.540	0.536
			Equity Multiplier (TA / TE)	3.72	3.72

Performance and Condition			Dupont Identify (ROE)		
	Original	Revised		Original	Revised
ROE (Net Income / Total Equity)	15.37%	15.37%	Profit Margin (NI/Sales)	3.25%	3.25%
ROA (Net Income / Total Assets)	4.13%	4.13%	Total Asset Turnover (Sales / TA)	1.27	1.27
Total Asset Turnover (Sales / TA)	1.27	1.27	Equity Multiplier (TA / TE)	3.72	3.72
			Return on Equity	15.37%	15.37%

The first step of the application allows the user to designate the amount of long-term debt issued by the company. The application then guides the user through a series of messages that demonstrate the effects of borrowing on the long term debt and cash accounts. The application shows, using the condition ratios, how the fiscal condition of the firm changes: the debt, debt to equity, current, quick, and cash ratios increase, and the equity multiplier rises, because the firm's long term debt and liquidity increases. The effects of the higher debt level on the year-end projected income statement is then presented: higher interest expense, lower Earnings before Taxes (EBT), tax expense (tax shield), and net income, changes in the amount paid out as dividends, and the change in the retained earnings account on the balance sheet. We then revisit the ratio summaries, showing that so far, the profit margin, times interest earned, and EBITDA coverage have suffered, and ROE, Return on Assets (ROA), and asset turnover are all reduced.

Exhibit 2. Initial Income Statement.

Income Statement		
	Original	Revised
Sales Revenue	58,800.00	58,800.00
Cash Operating Expenses		
Variable Costs	45,864.00	45,864.00
Fixed Costs	7,250.00	7,250.00
EBITDA	5,686.00	5,686.00
Non-Cash Operating Expenses		
Depreciation	2,250.00	2,250.00
EBIT	3,436.00	3,436.00
Interest	625.26	625.26
EBT	2,810.74	2,810.74
Taxes	899.44	899.44
Net Income	1,911.30	1,911.30
Dividends	477.83	477.83
Addition to Retained Earnings	1,433.48	1,433.48

Exhibit 3. Initial Balance Sheet.

Balance Sheet					
Assets			Liabilities and Owner's Equity		
	Original	Revised		Original	Revised
Current Asset			Current Liabilities		
Cash and Equivalents	12,569.00	12,569.00	Accounts Payable	15,223.00	15,223.00
Accounts Receivable	9,842.00	9,842.00	Accrued Wages and Taxes	4,373.00	4,373.00
Inventory	4,382.00	4,382.00	Notes Payable	3,843.00	3,843.00
Total Current Assets	26,793.00	26,793.00	Total Current Liabilities	23,439.00	23,439.00
			Long-term Debt	10,421.00	10,421.00
			Total Liabilities	33,860.00	33,860.00
Fixed Assets			Shareholder's Equity		
Gross	30,000.00	30,000.00	Common stock	2,554.00	2,554.00
Net	19,500.00	19,500.00	Retained earnings	9,879.00	9,879.00
			Total Shareholder's Equity	12,433.00	12,433.00
Total Assets	46,293.00	46,293.00	Total Shareholder Eq & Liabilities	46,293.00	46,293.00

A question is then posed to students: should the firm keep the borrowed funds in the cash account, or invest them? Some of our more astute students will recognize that firms shouldn't raise long term funding and then simply hold cash, a non-earning asset, so they conclude that investing the cash in productive assets is in order. Posing this question provides us an opportunity to first discuss liquidity and profitability, and then show the progression of effects from investing the cash raised through debt financing. The borrowed funds are invested in a ten-year asset (using straight line depreciation, for simplicity). We demonstrate the decrease in cash and increase in gross fixed assets, the

one-year effect on depreciation expense, accumulated depreciation and net fixed assets, and the accompanying decrease in income figures. At this point, we like to point out to students that the firm's profitability has done nothing but suffer- we have borrowed and spent money. But then we discuss the expected results from investment in fixed assets: sales generation and gains in income. We assume an increase in sales in accord with our prior asset turnover ratio, and trace the effects of the revenues throughout the income statement. As the changes are made in the income statement, corresponding changes occur in the firm's ratios, giving us an opportunity to discuss the usefulness of

Exhibit 4. Initial Performance and Condition Ratios

Performance		
	Original	Revised
Profit Margin (NI/Sales)	3.25%	3.25%
Operating Margin (EBIT / Sales)	5.84%	5.84%
TIE (EBIT / Interest)	5.50	5.50
EBITDA Coverage (EBITDA / Interest)	9.09	9.09

Condition		
	Original	Revised
Debt Ratio (TL/TA)	73.14%	73.14%
Debt / Equity Ratio (TL/TE)	2.72	2.72
Current Ratio (CA/CL)	1.14	1.14
Quick Ratio (CA - Inv) / CL)	0.956	0.956
Cash Ratio (Cash / CL)	0.540	0.536
Equity Multiplier (TA / TE)	3.72	3.72

Exhibit 5. Initial Combined and DuPont Ratios.

Performance and Condition		
	Original	Revised
ROE (Net Income / Total Equity)	15.37%	15.37%
ROA (Net Income / Total Assets)	4.13%	4.13%
Total Asset Turnover (Sales / TA)	1.27	1.27

Dupont Identify (ROE)		
	Original	Revised
Profit Margin (NI/Sales)	3.25%	3.25%
Total Asset Turnover (Sales / TA)	1.27	1.27
Equity Multiplier (TA / TE)	3.72	3.72
Return on Equity	15.37%	15.37%

performance ratios in analyzing the firm's income generation capability.

Exhibit 7. Completed Balance Sheet

Balance Sheet					
Assets			Liabilities and Owner's Equity		
	Original	Revised		Original	Revised
Current Asset			Current Liabilities		
Cash and Equivalents	12,569.00	12,755.70	Accounts Payable	15,223.00	15,223.00
Accounts Receivable	9,842.00	9,842.00	Accrued Wages and Taxes	4,373.00	4,373.00
Inventory	4,382.00	4,382.00	Notes Payable	3,843.00	3,843.00
Total Current Assets	26,793.00	26,979.70	Total Current Liabilities	23,439.00	23,439.00
			Long-term Debt	10,421.00	11,421.00
			Total Liabilities	33,860.00	34,860.00
Fixed Assets			Shareholder's Equity		
Gross	30,100.00	31,000.00	Common stock	2,554.00	2,554.00
Net	19,500.00	20,400.00	Retained earnings	9,879.00	9,965.70
			Total Shareholder's Equity	12,433.00	12,519.70
Total Assets	46,293.00	47,379.70	Total Shareholder Eq & Liabilities	46,293.00	47,379.70

Of particular interest is the effect on the DuPont Analysis. As students observe the changes, we have another opportunity to discuss the three basic elements of the firm's ability to generate return on equity: 1) the ability to generate sales, measured by the asset turnover, 2) the profitability of sales, measured by the net profit margin, and 3) the degree to which the firm uses creditor funding, measured by the equity multiplier.

Attention is then directed to the results reflected on the balance sheet so far; we note that the balance sheet does not yet balance, and pose the question to students about why this may be. The 'unbalanced' state of the balance sheet

Exhibit 6. Completed Income Statement.

Income Statement		
	Original	Revised
Sales Revenue	58,800.00	60,300.00
Cash Operating Expenses		
Variable Costs	45,864.00	47,034.00
Fixed Costs	7,250.00	7,250.00
EBITDA	5,686.00	6,016.00
Non-Cash Operating Expenses		
Depreciation	2,250.00	2,350.00
EBIT	3,436.00	3,666.00
Interest	625.26	685.26
EBT	2,810.74	2,980.74
Taxes	899.44	953.84
Net Income	1,911.30	2,026.90
Dividends	477.83	506.73
Addition to Retained Earnings	1,433.48	1,520.18

provides us a further opportunity to discuss the conclusion of the accounting cycle and the updates needed in order for the accounts to be finalized. We summarize the cash transactions and update the cash balance, we update the

Exhibit 8. Completed Performance and Condition Ratios

Performance		
	Original	Revised
Profit Margin (NI/Sales)	3.25%	3.36%
Operating Margin (EBIT / Sales)	5.84%	6.08%
TIE (EBIT / Interest)	5.50	5.35
EBITDA Coverage (EBITDA / Interest)	9.09	8.78

Condition		
	Original	Revised
Debt Ratio (TL/TA)	73.14%	73.58%
Debt / Equity Ratio (TL/TE)	2.72	2.78
Current Ratio (CA/CL)	1.14	1.15
Quick Ratio (CA - Inv) / CL)	0.956	0.964
Cash Ratio (Cash / CL)	0.540	0.544
Equity Multiplier (TA / TE)	3.72	3.78

retained earnings account based on net income and our fixed payout ratio, and wrap up the tutorial by discussing the changes that have occurred from borrowing money and purchasing and operating the fixed asset for one accounting period.

Throughout the exposition, the application makes use of highlight colors to draw attention to changes in each account. At the end of the discussion, the statements are updated, and the original and revised figures are displayed

in the ending income statement and balance sheet, and in the summaries of each category of financial ratios.

Exhibit 9. Completed Combined and DuPont Ratios

Performance and Condition		
	Original	Revised
ROE (Net Income / Total Equity)	15.37%	16.19%
ROA (Net Income / Total Assets)	4.13%	4.28%
Total Asset Turnover (Sales / TA)	1.27	1.27

Dupont Identify (ROE)		
	Original	Revised
Profit Margin (NI/Sales)	3.25%	3.36%
Total Asset Turnover (Sales / TA)	1.27	1.27
Equity Multiplier (TA / TE)	3.72	3.78
Return on Equity	15.37%	16.19%

Our experience with using this application suggests that students appreciate the view of the forest after studying the trees in their year of accounting principles courses. Since the manual processes for closing out an accounting period are essentially hidden with modern accounting packages, it is important to demonstrate that the transactions involved in managerial decisions have an eventual impact on the summaries of performance and condition. This understanding is helpful in developing competence in financial decision making.

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Stock Simulations: Game and Group Design to Reduce Risky Behavior and Enhance Learning

Nancy Lottridge Anderson

Stock simulations have been used at all levels of education to teach about the investment process. For college classes, a 15 week semester means the game will be limited to around 12 weeks. The short-term nature of the game may encourage risky behavior, but the educational component of the simulation may be worth the exposure to risk-taking in order to enhance learning through a hands-on experience. I design a simulation and construct various types of student groups. Through observations and a student questionnaire, I determine that simulation complements a traditional lecture. I also find that the design of the game and the design of student groups may reduce risky behavior and enhance learning.

INTRODUCTION

Hands-on or experiential learning through simulations, including but not limited to stock market simulations, are commonly used at all levels of education. When studying the impact of such simulations, Siegfried and Fels (1979) find a positive impact in seven key areas: cognitive achievement, student attitudes, retention, and the distribution of benefits between high and low-achieving students. Paden (1980)

finds that students involved in simulations spent less time studying while performing better on exams. Joseph (1970) finds that the use of a simulation increases student interest in the course material. When surveying students on a particular game, he finds that 75% of students are more interested in the subject and 90% suggest that the simulation should become a permanent part of the curriculum.

Boehlje and Eidman (2001) point out that the effectiveness of simulations as teaching tools depends on the