

Using the Expectations Model to Help Detect Financial Fraud

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Abstract

Statements on Auditing Standards (SASs) No. 109 describes the auditor gain enough understanding of the firm to assess the risk of material misstatement of the financial statements due to either error or fraud. The analytical model and case presented here demonstrates a technique for developing expectations and providing a benchmark for comparing actual to expected results to check for fraud. The model is especially appropriate in evaluating a company's growth.

Expectations Model

Financial Fraud

1. Introduction

Accounting literature suggests the accountant develop expectations when performing analytics. Textbooks (Brigham and Daves 2013), articles, and auditing standards such as *Statements on Auditing Standards (SASs) No. 109* (as well as *Statements on Standards for Accounting and Review Services No. 19, 21* for Reviews) provide guides when using analytical techniques to understand financial statements and identify areas for investigation. Nogler (2014) states the auditor needs to understand where the risks are coming from and Miller, Cipriano and Ramsay (2012) indicate a change in a firm's sales may have an uncertain effect on the accuracy of the financial statements which may be caused by fraud. When performing analytics, the accountant should:

- Determine the suitability of a particular analytical procedure
- Evaluate the reliability of the source data for the procedure
- Develop an expectation of recorded amounts or ratios
- Compare the recorded amounts, or ratios developed from recorded amounts, with the expectations

Analytical methods range from simple comparisons to performing complex analyses using advanced statistical techniques. The analytical model and case presented here demonstrates a technique for developing expectations and providing a benchmark for comparing actual to expected results. The model is especially appropriate in evaluating a company's growth.

2. An Analytical Model and Case

Duncan is the new controller for Miller Company, a manufacturer of digital component part for computers. One of Duncan's first tasks is to understand Miller's financial statements and in particular its recent growth in revenue.

Duncan discovered that Miller's sales had increased significantly, dividends paid had increased, and there was no increase in long-term borrowing or additional shares of stock issued. Miller did, however, increase short-term borrowing by \$50.

As a starting point Duncan prepared Common Size financial statement comparisons and computed several analytical ratios for the current and two prior years. The results are shown in Tables 1 and 2. For the time being, ignore the last column of the tables, Expected 2018, and Scenarios 1 and 2.

Comparing analytics for prior and current years raises two issues. First, computation of a ratio does not consider changes in capacity. A prior year ratio like inventory turnover could be based on a 90% usage of available operating capacity while the current year may have achieved a 100% usage of capacity. Sales, production, and other activities may have changed because the company made better use of existing resources.

A second issue with comparing prior and current year analytics is expectations. Table 2 shows the prior two years Inventory Turnover as 4.0 and 4.1 while the current year turnover is 5.2. Central questions are, "given the overall performance of the company, what level of inventory turnover for the current year did we expect?" While an increase from 4.1 to 5.2 may seem significant, is the increase in turnover consistent with other changes in performance? Would we expect the turnover to be less than or greater than the prior years? If we expect a higher current year inventory turnover then the question is how much higher? Without developing expectations we can only rely on our past experiences or rules-of-thumb to answer these questions. A solution to both the capacity issue and expectations is to use a model that develops expected balances in all accounts to use in computing comparable analytics.

3. The Expectation Model

The Expectation Model (EM) is a variation of the analytics accountants use daily and is easy to compute using spreadsheets. Practitioners can find the model in various continuing education courses and in Financial Management textbooks (see Brigham and Daves 2013). The model is appropriate for any entity structure or size, focuses on two key elements of a company's performance, its operating cycle and funding, and provides an approximate amount of resources needed to support growth.

EM = required increase in spontaneous assets minus increase in spontaneous liabilities minus increase in retained earnings.

Spontaneous assets and liabilities are those accounts tied directly to sales and, therefore, must change proportionately to changes in sales. The most prominent spontaneous accounts are cash, receivables, inventory, and accounts payable. If a company is operating at full capacity then some or all fixed assets such as equipment would be spontaneous. Similarly, payables such as accruals, notes and long-term debt may be spontaneous.

Miller has operated at 95% of capacity for the prior and current years. The capacity utilization rate is based on production equipment output on an annual basis with an adjustment from theoretical to practical capacity. Similar estimates of capacity for non-manufacturing companies can be based on employee output measures such as number of sale-calls, time to process customer orders, or installation time for products sold.

Elements of the EM model are:

Percentage of required assets to sales (SA) = Spontaneous Assets / Prior year sales

Change in Sales (ΔS) = Current year – Prior year sales

Percentage of Spontaneous liabilities (SL) = Spontaneous Liabilities / Prior year sales

Profit Margin (PM) = Net Income / Prior year sales

Percentage of earnings retained in business (PR) = 1 - (Dividends / Net Income)

EM = (SA X ΔS) – (SL X ΔS) – ((PM X Current year sales) X PR)

Table 3 shows the development of expected balances for the 2018 financial statements based on the information gathered and the prior year's financial statements, shown in column one. The second column of Table 3, *First Projection of 2018*, uses the increase in sales and excess capacity to predict the financial statement account balances without considering any increase in funding except from retained earnings. For example, the inventory balance at 12/31/2017 was 21.3% of 2017 sales. Assuming no change in inventory policies, we would predict the 2018 inventory balance at \$709 (21.3% of \$3,325 sales in 2018). Cash, Accounts Receivable and Payables, and Net Property & Equipment would be predicted in the same manner.

Holding Notes Payable, Long-term Debt, and Common Stock steady at 2017 levels, Miller Company requires an additional \$135 of funding to achieve a sales increase of \$325 (Total Assets of \$2,217 minus Total Liabilities & Equity of \$2,082).

Miller could achieve the increase of \$325 in sales through utilization of excess capacity, increase debt, issue additional capital stock, or increase retained earnings. Given no new capital stock was issued, no decrease in dividends (Miller actually increased dividends in 2018), no significant change in the revenue/costs structure, and long-term debt did not change, the only sources for additional funds for growth are from excess capacity utilization and Notes Payable. The computation of excess Net Property that could be used to achieve additional sales is:

Expected 2018 Net Property and Excess Capacity

Prior Year Sales	\$3,000
Prior Year Operating Capacity	<u>95%</u>
Achievable Sales if operating at Full Capacity (\$3,000 / 95%)	\$3,158
Relationship Achievable Sales to Prior Year Net Property (\$1,000 / \$3,158)	31.67%
Expected Net Property for 2018 (2018 sales of \$3,325 X 31.67%)	\$1,053
Actual 2018 Net Property	<u>\$1,100</u>
Excess Capacity	\$47

After factoring the \$47 of excess capacity adjustment into our analysis (Table 3, column 2), we note that Miller still requires an additional \$88 of funding to provide the necessary resources for a growth of \$325 in sales.

Duncan made a final prediction of the 2018 financial statements (column 3 of Table 3, *Final Projection*) assuming all additional funding would come from an increase in Notes Payable. Recall the company did not increase long-term debt or common stock. Using the EM, Duncan estimated that Miller would need \$92 of additional Notes Payable. The difference between the model output of \$92 and the initial estimate of \$88 results from after-tax additional interest expense.

Application of the EM model is based on the prior year amounts for assets and liabilities, profit margin and dividend payout ratios. Since the company is operating at less than full capacity, Spontaneous Assets equals prior year Current Assets plus \$950 of prior year Net Property & Equipment adjusted for capacity utilization (\$1,000 X 95%). Spontaneous assets are, therefore, \$1,000 plus \$950 or \$1,950. To identify funding needs from liabilities, the computation sets Spontaneous Liabilities equal to 2017 Accounts Payable.

Additional Funds Needed, Operating at 95% Capacity

(Spontaneous Assets / Prior Yr Sales) X Change in Sales	\$ 211
(Spontaneous Liabilities / Prior Yr Sales) X Change in Sales	22
(Profit Margin X Current Yr Sales) X (1 – Dividend Payout Ratio)	<u>50</u>
Additional Funds Needed for 2018 before capacity adjustment	139
Capacity adjustment	<u>47</u>
Additional Funds Needed for 2018 growth	92
Notes Payable 2017	<u>100</u>
Expected Notes Payable 2018	\$ <u>192</u>

Comparing the final expected account balances to actual 2018 balances (columns 3 and 4 of Table 3) indicates several areas that require investigation. Specifically, Accounts Receivable, Inventory, Accounts Payable, and Dividends differ significantly from expectations. Perhaps more importantly, the increase in short-term borrowing does not appear to support the increase in sales suggesting a need to thoroughly test revenues.

Returning to Tables 1 and 2, the auditor now has a basis for computing expected analytics. The fourth column of each table provides expected relationships and ratios for comparison with actual results (column 3).

To further identify inconsistent account levels, the accountant could run different scenarios of the EM model. If actual 2018 sales were replaced with sales based on the expected level of variable costs (\$2,879/89.3%), 2018 sales would equal \$3,224. With this amount of sales, additional funds needed from Notes Payable would be only \$3, well below the actual increase of \$50.

Scenario 1 of Table 2 shows the comparative ratios at a sales level of \$3,224. The Return on Assets ratio shows a significant change and is more consistent with prior years and expectations.

A second possible scenario is to change actual variable costs of \$2,879 to \$2,970, the expected amount based on actual results. As shown in Scenario 2 of Table 2 Return on Assets and Inventory Turnover ratios are closer to expectations. These two scenarios suggest that sales are overstated and/or costs understated. Given the original finding of insufficient funding together with these two analyses, Duncan, the controller, now has additional information to consider in reviewing the company's financial performance.

4. Developing Expectations

Controllers, external and internal auditors, as well as other financial professionals, need benchmarks against which results can be measured. While traditional ratio analysis is a powerful tool, integration of the individual ratios presents a stronger analysis of operating performance. The Expectation Model shown here provides one way of developing financial statement level expectations to help the accountant gain a better understanding of a company's financial statements, strategic decisions, trends and potential fraud.

References

- Brigham, Eugene F. and Phillip R. Daves. *Intermediate Financial Management, 11th Edition* (2013) pp. 323-345.
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Table 1**Miller Company****Common Size Statement of Financial Position****December 31,**

	Actual <u>2016</u>	Actual <u>2017</u>	Actual <u>2018</u>	Expected <u>2018</u>
Assets				
Current Assets:				
Cash	0.5%	0.5%	0.5%	0.5%
Accounts Receivable	15.0%	17.5%	19.4%	17.9%
Inventories	<u>33.6%</u>	<u>32.0%</u>	<u>29.7%</u>	<u>32.8%</u>
Total Current Assets	49.1%	50.0%	49.7%	51.3%
Net Property & Equipment	<u>50.9%</u>	<u>50.0%</u>	<u>50.3%</u>	<u>48.7%</u>
Total Assets	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>
Liabilities & Stockholders' Equity				
Accounts Payable & Accruals	10.7%	10.0%	11.0%	10.3%
Notes Payable	5.1%	5.0%	6.9%	8.9%
Long-term Debt	<u>37.2%</u>	<u>36.5%</u>	<u>33.4%</u>	<u>33.8%</u>
Total Liabilities	53.0%	51.5%	51.2%	52.9%
Stockholders' Equity				
Common Stock	7.6%	7.5%	6.9%	6.9%
Retained Earnings	<u>39.4%</u>	<u>41.0%</u>	<u>41.9%</u>	<u>40.2%</u>
Total Stockholders' Equity	47.1%	48.5%	48.8%	47.1%
Total Liabilities & Equity	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>

**Common Size Income Statement
For Years Ended December 31,**

	Actual <u>2016</u>	Actual <u>2017</u>	Actual <u>2018</u>	Expected <u>2018</u>
Sales	100.0%	100.0%	100.0%	100.0%
Cost - variable	89.5%	89.3%	86.6%	89.3%
Fixed costs - depreciation	3.4%	3.3%	3.3%	3.2%
Interest expense	<u>2.1%</u>	<u>2.0%</u>	<u>2.1%</u>	<u>2.6%</u>
Earnings before taxes	5.1%	5.3%	8.0%	4.9%
Taxes @ 40%	<u>2.0%</u>	<u>2.1%</u>	<u>3.2%</u>	<u>2.0%</u>
Net Income	3.0%	3.2%	4.8%	2.9%
Dividends	<u>1.5%</u>	<u>1.7%</u>	<u>1.9%</u>	<u>1.5%</u>
Addition to retained earnings	<u>1.5%</u>	<u>1.5%</u>	<u>2.9%</u>	<u>1.4%</u>

Table 2**Miller Company****Ratio Comparisons****December 31,**

	Actual <u>2016</u>	Actual <u>2017</u>	Actual <u>2018</u>	Expected <u>2018</u>
Current Ratio	3.1	3.3	2.8	2.7
Accounts Receivable Turnover	10.0	9.3	8.6	9.0
Inventory Turnover	4.0	4.1	5.2	4.9
Asset Turnover	1.5	1.5	1.6	1.6
Return on Assets	4.6%	4.8%	7.6%	4.7%
Debt to Total Assets	53.0%	51.5%	51.2%	52.9%
Payout Ratio	50.3%	52.4%	39.0%	51.1%

Scenario 1**Sales at Expected Level of \$3,224**

	Actual <u>2016</u>	Actual <u>2017</u>	Actual <u>2018</u>	Expected <u>2018</u>
Current Ratio	3.1	3.3	2.8	3.4
Accounts Receivable Turnover	10.0	9.3	8.3	8.9
Inventory Turnover	4.0	4.1	5.0	4.9
Asset Turnover	1.5	1.5	1.5	1.6
Return on Assets	4.6%	4.8%	4.7%	4.7%
Debt to Total Assets	53.0%	51.5%	51.2%	50.0%
Payout Ratio	50.3%	52.4%	63.0%	51.6%

Scenario 2**Costs at Expected Level of \$2,970**

	Actual <u>2016</u>	Actual <u>2017</u>	Actual <u>2018</u>	Expected <u>2018</u>
Current Ratio	3.1	3.3	2.8	2.7
Accounts Receivable Turnover	10.0	9.3	8.6	9.0
Inventory Turnover	4.0	4.1	5.2	4.9
Asset Turnover	1.5	1.5	1.6	1.6
Return on Assets	4.6%	4.8%	5.0%	4.7%
Debt to Total Assets	53.0%	51.5%	51.2%	52.9%
Payout Ratio	50.3%	52.4%	59.4%	51.1%

Table 3**Miller Company****Actual and Projected Statements of Financial Position****December 31,**

	<u>Actual 2017</u>	<u>First Projection</u>	<u>Final Projection</u>	<u>Actual 2018</u>
Assets				
Current Assets:				
Cash	\$ 10	\$ 11	\$ 11	\$ 12
Accounts Receivable	350	388	388	425
Inventory	<u>640</u>	<u>709</u>	<u>709</u>	<u>650</u>
Total Current Assets	1,000	1,108	1,108	1,087
Net Property & Equipment	<u>1,000</u>	<u>1,108</u>	<u>1,053</u>	<u>1,100</u>
Total Assets	<u>\$ 2,000</u>	<u>\$ 2,217</u>	<u>\$ 2,161</u>	<u>\$ 2,187</u>
Liabilities & Stockholders' Equity				
Current Liabilities:				
Accounts Payable	\$ 200	\$ 222	\$ 222	\$ 240
Notes Payable	100	100	192	150
Long-term Debt	<u>730</u>	<u>730</u>	<u>730</u>	<u>730</u>
Total Liabilities	1,030	1,052	1,144	1,120
Stockholders' Equity				
Common Stock	150	150	150	150
Retained Earnings	<u>820</u>	<u>880</u>	<u>868</u>	<u>917</u>
Total Equity	<u>970</u>	<u>1,030</u>	<u>1,018</u>	<u>1,067</u>
Rounding			(1)	
Growth using Excess Capacity		47		
Total Liabilities & Stockholders' Equity	<u>\$ 2,000</u>	<u>2,129</u>	<u>\$ 2,161</u>	<u>\$ 2,187</u>
Additional Funds Needed		<u>\$ 88</u>		

Miller Company**Actual and Projected Income Statements****For Years Ending December 31,**

	<u>Actual 2017</u>	<u>First Projection</u>	<u>Final Projection</u>	<u>Actual 2018</u>
Sales	\$ 3,000	\$ 3,325	\$ 3,325	\$ 3,325
Cost of Sales	2,680	2,970	2,970	2,879
Depreciation	100	111	105	110
Interest	<u>61</u>	<u>61</u>	<u>86</u>	<u>71</u>
Income Before Taxes	159	183	163	265
Taxes	<u>64</u>	<u>73</u>	<u>65</u>	<u>106</u>
Net Income	95	110	98	159
Dividends	<u>50</u>	<u>50</u>	<u>50</u>	<u>62</u>
Increase in Retained Earnings	<u>\$ 45</u>	<u>\$ 60</u>	<u>\$ 48</u>	<u>\$ 97</u>