

The Thoughtful Forecaster

Every day, fortunes are won and lost on the backs of business-performance forecasts. Investors who successfully anticipate business development are rewarded handsomely. Investors who fail to anticipate such development pay the penalty. This note examines principles in the art and science of thoughtful financial forecasting. In particular, it reviews the importance of (1) understanding the financial relationships of a business enterprise, (2) grounding business forecasts in the reality of the industry and macroenvironment, (3) modeling a base-case forecast that incorporates the expectations for business strategy, and (4) recognizing the potential for cognitive bias in the forecasting process. Forecasting is not the same as fortune-telling; unanticipated events have a way of making certain that specific forecasts are never completely correct. This note purports, however, that thoughtful forecasts aid understanding of the key bets in any forecast and the odds associated with success. It closes with an example of financial forecasting based on the Maytag Corporation, a U.S. appliance manufacturer.

Understanding the Financial Relationships of the Business Enterprise

Financial statements provide information on the financial activities of an enterprise. Much like the performance statistics from an athletic contest, financial statements provide an array of identifying data on various historical strengths and weaknesses across a broad spectrum of business activities. The income statement, or profit-and-loss statement, measures *flows* of costs, revenue, and profits over a defined period of time. The balance sheet provides a *snapshot* of business investment and financing at a particular point in time. Both statements combine to provide a rich picture of a business's financial performance. Thorough analysis of financial statements is one important way of understanding the mechanics of the systems that make up business operations.

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Interpreting Financial Ratios

Financial ratios provide a useful way to identify and compare relationships across financial-statement line items.¹ Trends in the relationships captured by financial ratios are particularly helpful in modeling a financial forecast. The comparison of ratios across time or with similar firms provides diagnostic tools for assessing the health of the various systems in the enterprise. We review below common financial ratios for examining business-operating performance. An understanding of the current condition of the business can be used to anticipate prospective performance.

Growth Rates Growth rates capture the year-on-year percentage change in a particular line item. For example, if total revenue for a business increases from \$1.8 million to \$2.0 million, the total revenue growth for the business is said to be 11.1% $[(2.0 - 1.8)/1.8]$. Total revenue growth can be further decomposed into two other growth measures: unit growth (the growth in revenue due to an increase in units sold) and price growth (the growth in revenue due to an increase in the price of each unit). In the above example, if unit growth for the business is 5.0%, the remaining 6.1% of total growth can be attributed to price growth or price inflation.

Margins Margin ratios capture the percentage of revenue accounted for by profit or, alternatively, the percentage of revenue not consumed by business costs. For example, if operating profit² is \$0.2 million and total revenue is \$2.0 million, the operating margin is 10% $(0.2/2.0)$. Thus, for each revenue dollar, \$0.90 is consumed by operating expenses and an operating profit of \$0.10 is generated. The margin also measures the cost structure of the business. Common definitions of margin include the following:

$$\begin{aligned}\text{Gross margin} &= \text{Gross profit/Total revenue} \\ \text{Operating margin} &= \text{Operating profit/Total revenue} \\ \text{Net profit margin} &= \text{Net income/Total revenue}\end{aligned}$$

Turnover Turnover ratios measure the productivity, or efficiency, of business assets. The turnover ratio is constructed by dividing a related measure of volume from the income statement by a measure of investment from the balance sheet. For example, if total revenue is \$2.0 million and total assets are \$2.5 million, the asset-turnover measure is 0.8 times $(2.0/2.5)$. Thus, each dollar of total asset investment is producing \$0.80 in revenue or, alternatively, total assets are turning over 0.8 times a year

¹The analogy of athletic-performance statistics is again useful in understanding how ratios provide additional meaningful information. In measuring the effectiveness of a batter in baseball, the batting average (number of hits \div number of at-bats) may be more useful than simply knowing the number of hits. In measuring the success of a running back in football, the ratio of “rushing yards gained per carry” may be more useful than simply knowing the total rushing yards gained.

²Operating profit is also commonly referred to as earnings before interest and taxes (EBIT).

through the operations of the business. Productive or efficient assets produce high levels of asset turnover. Common measures of turnover include the following:

$$\text{Receivable turnover} = \text{Total revenue}/\text{Accounts receivable}$$

$$\text{Inventory turnover}^3 = \text{Cost of goods sold}/\text{Inventory}$$

$$\text{PPE turnover} = \text{Total revenue}/\text{Net property, plant, equipment}$$

$$\text{Asset turnover} = \text{Total revenue}/\text{Total assets}$$

$$\text{Total capital turnover} = \text{Total revenue}/\text{Total capital}$$

$$\text{Payable turnover}^3 = \text{Cost of goods sold}/\text{Accounts payable}$$

An alternative and equally informative measure of asset productivity is a “days” measure, which is computed as the investment amount divided by the volume amount multiplied by 365 days. This measure captures the average number of days in a year that an investment item is held by the business. For example, if total revenue is \$2.0 million and accounts receivable is \$0.22 million, the accounts-receivable days are calculated as 40.2 days ($0.22/2.0 \times 365$). In other words, the average receivable is held by the business for 40.2 days before being collected. The lower the days measure, the more efficient is the investment item. The days measure does not actually provide any information not already contained in the respective turnover ratio, as it is simply the inverse of the turnover measure multiplied by 365 days. Common days measures include the following:

$$\text{Receivable days} = \text{Accounts receivable}/\text{Total revenue} \times 365 \text{ days}$$

$$\text{Inventory days} = \text{Inventory}/\text{Cost of goods sold} \times 365 \text{ days}$$

$$\text{Payable days} = \text{Accounts payable}/\text{Cost of goods sold} \times 365 \text{ days}$$

Return on Investment Return on investment captures the profit generated per dollar of investment. For example, if operating profit is \$0.2 million and total assets are \$2.5 million, pretax return on assets is calculated as operating profit divided by total assets ($0.2/2.5$), or 8%. Thus, the total dollars invested in business assets are generating pretax operating-profit returns of 8%. Common measures of return on investment include the following:

$$\text{Pretax return on assets} = \text{Operating profit}/\text{Total assets}$$

$$\text{Return on capital (ROC)} = \text{Operating profit} \times (1 - \text{Tax rate})/\text{Total capital}$$

(where Total capital = Total assets – Non-interest-bearing current liabilities)

$$\text{Return on equity (ROE)} = \text{Net income}/\text{Shareholders' equity}$$

It is worth observing that return on investment can be decomposed into a margin effect and a turnover effect. This relationship means that the same level of business profitability can be attained by a business with high margins and low turnover (e.g.,

³For inventory turnover and payable turnover, it is customary to use cost of sales as the volume measure because inventory and purchases are on the books at cost rather than at the expected selling price.

Nordstrom) as by a business with low margins and high turnover (e.g., Wal-Mart). This decomposition can be shown algebraically for pretax return on assets:

$$\begin{aligned} \text{Pretax ROA} &= \text{Operating margin} \times \text{Asset turnover} \\ \frac{\text{Operating profit}}{\text{Total assets}} &= \frac{\text{Operating profit}}{\text{Total revenue}} \times \frac{\text{Total revenue}}{\text{Total assets}} \end{aligned}$$

Notice that the equality holds because the quantity for total revenue cancels out across the two right-hand ratios.

Using Financial Ratios in Financial Models

Financial ratios are particularly helpful when forecasting financial statements because financial ratios capture relationships across financial-statement line items that tend to be preserved over time. For example, rather than forecasting explicitly the gross-profit dollar amount for next year, it may be easier to forecast a revenue growth rate and a gross margin that, when applied to current-year revenue, give an implicit dollar forecast for gross profit. Thus, if we estimate revenue growth at 5% and operating margin at 24%, we can apply these ratios to last year's total revenue of \$2.0 million to derive an implicit gross-profit forecast of \$0.5 million [$2.0 \times (1 + 0.05) \times 0.24$]. Given some familiarity with the financial ratios of a business, the ratios are generally easier to forecast than the expected dollar values. In effect, we model the future financial statements based on assumptions about future financial ratios.

Financial models can be helpful in identifying the impact of particular assumptions on the forecast. For example, models easily allow us to see the financial impact on dollar profits of a difference of one percentage point in operating margin. To facilitate such a scenario analysis, financial models are commonly built in electronic-spreadsheet packages such as Excel. Good financial-forecast models make the forecast assumptions highly transparent. To achieve transparency, assumption cells for the forecast should be prominently displayed in the spreadsheet (e.g., total-revenue-growth-rate assumption cell, operating-margin assumption cell), and then those cells should be referenced in the generation of the forecast. In this way, it becomes easy not only to vary the assumptions for different forecast scenarios, but also to scrutinize the forecast assumptions.

Grounding Business Forecasts in the Reality of the Industry and Macroenvironment

Good financial forecasts recognize the impact of the business environment on the performance of the business. Financial forecasting should be grounded in an appreciation for industry- and economy-wide pressures. Because business performance tends to be correlated across the economy, information regarding macroeconomic business trends should be incorporated into a business's financial forecast. If, for example, price increases for a business are highly correlated with economy-wide inflation trends, the financial forecast should incorporate price-growth assumptions that capture the

available information on expected inflation. If the economy is in recession, the forecast should be consistent with that economic reality.

Thoughtful forecasts should also recognize “industry reality.” Business prospects are dependent on the structure of the industry in which the business operates. Some industries tend to be more profitable than others. Microeconomic theory provides some explanations for the variation in industry profitability. Profitability within an industry is likely to be greater if (1) barriers to entry discourage industry entrants, (2) ease of industry exit facilitates redeployment of assets for unprofitable players, (3) industry participants exert bargaining power over buyers and suppliers, or (4) industry consolidation reduces price competition.⁴ **Table 1** shows the five most profitable industries and the five least profitable industries in the United States based on median pretax ROAs for all public firms from 1994 to 2004. Based on the evidence, firms operating in the apparel and accessory retail industry should have systematically generated more profitable financial forecasts over that period than did firms in the metal-mining industry. One explanation for the differences in industry profitability is the ease of industry exit. In the retail industry, unprofitable businesses are able to sell their assets easily for redeployment elsewhere. In the metal-mining industry, where asset redeployment is much more costly, industry capacity may have dragged down industry profitability.

Being within a profitable industry, however, does not ensure superior business performance. Business performance also depends on the competitive position of the firm within the industry. **Table 2** shows the variation of profitability for firms within the U.S. apparel and accessory industry from 1994 to 2004. Despite being the most profitable industry in **Table 1**, there is large variation in profitability within the industry; in fact, three firms generated median ROAs that were actually negative (Harold’s, Syms, and Stage Stores). Good forecasting considers the ability of a business to sustain performance given the structure of its industry and its competitive position within that industry.

TABLE 1 | Most profitable and least profitable U.S. industries, 1994–2004. Ranking of two-digit SIC code industries based on median pretax ROAs for all public firms followed by Compustat from 1994 to 2004.

Most Profitable Industries	Median Firm ROA	Least Profitable Industries	Median Firm ROA
Apparel and accessory stores	12.1%	Metal mining	–1.4%
Building-construction contractors	11.0%	Chemicals and allied products	0.0%
Furniture and fixture manufacturers	10.7%	Business services	0.3%
Leather/leather-products manufacturers	10.5%	Banking	2.1%
Petroleum refining	10.0%	Insurance carriers	2.5%

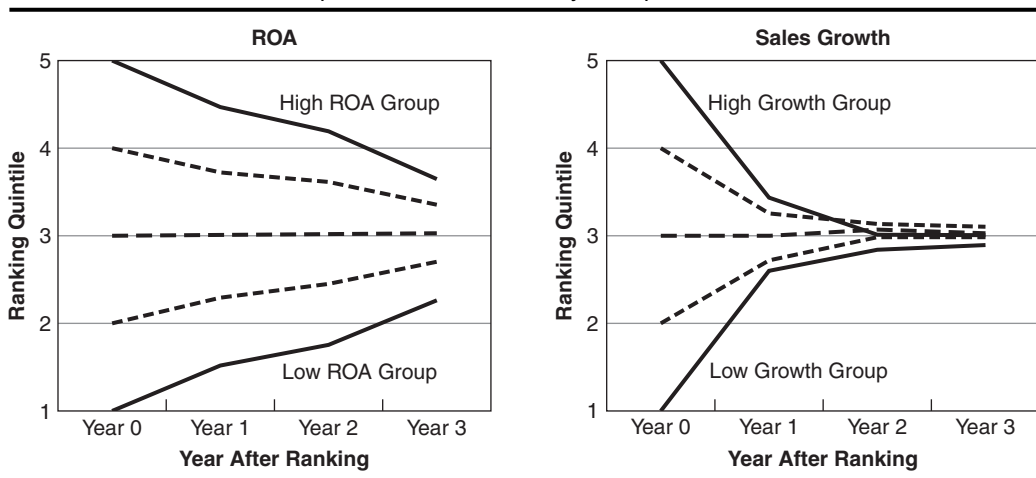
⁴Michael E. Porter, “How Competitive Forces Shape Strategy,” *Harvard Business Review* 57, no. 2 (March–April 1979): 137–45.

TABLE 2 | Most and least profitable firms within the apparel and accessory retail industry, 1994–2004. Ranking of firms based on median pretax ROAs for all public firms in the apparel and accessory retail industry followed by Compustat from 1994 to 2004.

Most Profitable Firms	Median Firm ROA	Least Profitable Firms	Median Firm ROA
Chico's	35.3%	Harold's	−9.7%
Abercrombie & Fitch	35.2%	Syms	−2.1%
Christopher & Banks	32.1%	Stage Stores	−1.2%
American Eagle Outfitters	28.0%	Guess	1.9%
Hot Topic	26.9%	United Retail	2.7%

Abnormal profitability is difficult to sustain over time. Competitive pressure tends to bring abnormal performance toward the mean. To show this effect, we sort all U.S. public companies for each year from 1994 to 2004 into five groups (Group 1 [low profits] through Group 5 [high profits]) based on their annual ROAs and sales growth. We then follow what happens to the composition of these groups over the next three years. The results of this exercise are captured in **Figure 1**. The ROA graph shows the mean group rankings for firms in subsequent years. For example, firms that rank in Group 5 (top ROA) at Year 0 tend to have a mean group ranking of 4.5 in Year 1,

FIGURE 1 | Firm-ranking transition matrix by profitability and sales growth. Firms are sorted for each year into five groups by either annual pretax ROA or sales growth. For example, in the ROA panel, Group 1 comprises the firms with the lowest 20% of ROA for the year; Group 5 comprises the firms with the highest 20% of ROA for the year. The figure plots the mean ranking number for all U.S. public firms followed by Compustat from 1994 to 2004.



4.2 in Year 2, and 3.7 in Year 3. Firms that rank in Group 1 (bottom ROA) at Year 0 tend to have a mean group ranking of 1.5 in Year 1, 1.8 in Year 2, and 2.3 in Year 3. There is a systematic drift toward average performance (3.0) over time. The effect is even stronger vis-à-vis sales growth. **Figure 1** provides the transition matrix for average groups sorted by sales growth. Here we see that, by Year 2, the average sales-growth ranking for the high-growth group is virtually indistinguishable from that of the low-growth group.

Figure 1 illustrates that business is fiercely competitive. It is naïve to assume that superior business profitability or growth can continue unabated for an extended period of time. Abnormally high profits attract competitive responses that eventually return profits to normal levels.

Modeling a Base-Case Forecast That Incorporates Expectations for Business Strategy

With a solid understanding of the business's historical financial mechanics and of the environment in which the business operates, the forecaster can incorporate the firm's operating strategy into the forecast in a meaningful way. All initiatives to improve revenue growth, profit margin, and asset efficiency should be explicitly reflected in the financial forecast. The forecast should recognize, however, that business strategy does not play out in isolation. Competitors do not stand still. A good forecast recognizes that business strategy also begets competitive response. All modeling of the effects of business strategy should be tempered with an appreciation for the effects of aggressive competition.

One helpful way to temper the modeling of the effects of business strategy is to complement the traditional "bottom-up" approach to financial forecasting with a "top-down" approach. The top-down approach starts with a forecast of industry sales and then works back to the particular business of interest. The forecaster models firm sales by modeling market share within the industry. Such a forecast makes more explicit the challenge that sales growth must come from either overall industry growth or market-share gain. A forecast that explicit, demanding a market-share gain of, say, 20%–24%, is easier to scrutinize from a competitive perspective than a forecast that simply projects sales growth without any context (e.g., at an 8% rate).

Another helpful forecasting technique is to articulate business perspectives into a coherent qualitative "view" on business performance. This performance view encourages the forecaster to ground the forecast in a qualitative vision of how the future will play out. In blending qualitative and quantitative analyses into a coherent story, the forecaster develops a richer understanding of the relationships between the financial forecast and the qualitative trends and developments in the enterprise and its industry.

Forecasters can better understand their models by identifying the forecast's "value drivers," which are those assumptions that strongly affect the overall outcome. For example, for some businesses the operating-margin assumption may have a dramatic impact on overall business profitability, whereas the assumption for inventory turnover may make little difference. For other businesses, the inventory turnover may have a tremendous impact and thus be a value driver. In varying the assumptions, the forecaster can better appreciate which assumptions matter and thus channel resources to improve

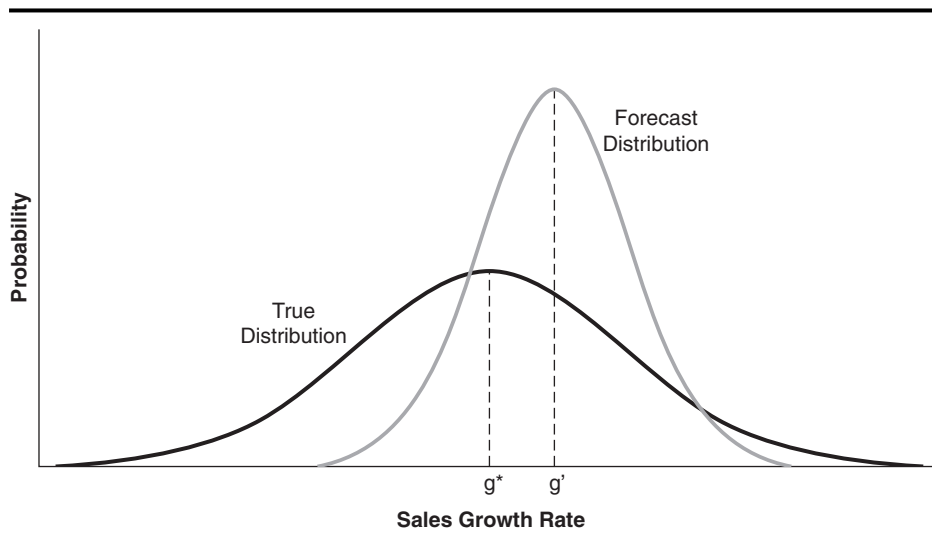
the forecast's precision by shoring up a particular assumption or altering business strategy to improve the performance of a particular line item.

Lastly, good forecasters understand that it is more useful to think of forecasts as ranges of possible outcomes than as precise predictions. A common term for forecast is "base case." A forecast represents the "best-guess" outcome or "expected value" of the forecast's line items. In generating forecasts, it is also important to have an unbiased appreciation for the range of possible outcomes, which is commonly done by estimating a high-side and a low-side scenario. In this way, the forecaster can bound the forecast with a relevant range of outcomes and can best appreciate the key bets in a financial forecast.

Recognizing the Potential for Cognitive Bias in the Forecasting Process

A substantial amount of research suggests that human decision making can be systematically biased. Bias in financial forecasts creates systematic problems in managing and investing in the business. Two elements of cognitive bias that play a role in financial forecasting are *optimism bias* and *overconfidence bias*. This note defines optimism bias as systematic positive error in the *expected value* of an unknown quantity, and defines overconfidence bias as systematic negative error in the *expected variance* of an unknown quantity. The definitions of these two terms are shown graphically in **Figure 2**. The dark curve shows the true distribution of the sales-growth rate. The realization of the growth rate is uncertain, with a higher probability of its being in the central part of the distribution. The expected value for the sales-growth rate is g^* ; thus,

FIGURE 2 | Optimism bias and overconfidence bias in forecasting sales-growth rate.



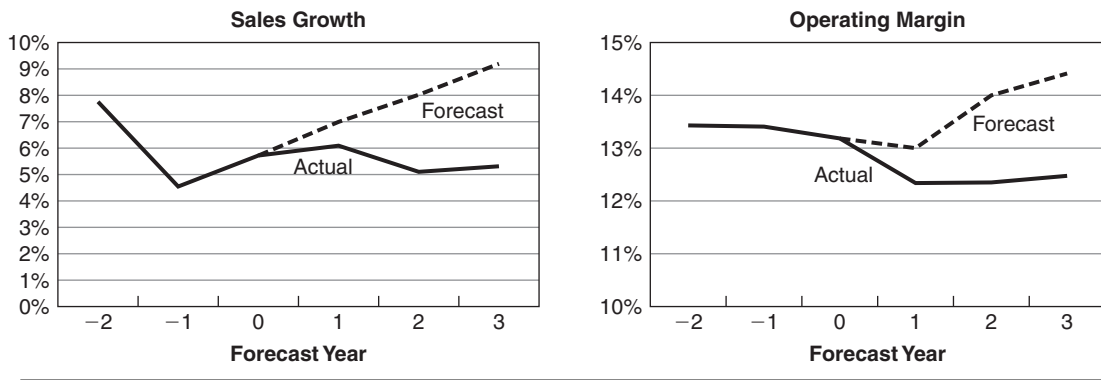
the proper base-case forecast for the sales-growth rate is precisely g^* . The light curve shows the distribution expected by the average forecaster. This distribution is biased for two reasons. First, the expected value is too high. The forecaster expects the base-case sales-growth rate to be g' , rather than g^* . Such positive bias for expected value is termed optimistic. Second, the dispersion of the distribution is too tight. This dispersion is captured by the variance (or standard-deviation) statistic. Because the forecast dispersion is tighter than the true dispersion, the forecaster exhibits negative variance bias, or overconfidence—the forecaster believes that the forecast is more precise than it really is.

To test for forecasting bias among business-school forecasters, an experiment was performed in 2005 with the 300 first-year MBA students at the Darden Graduate School of Business Administration at the University of Virginia. Each student was randomly assigned both a U.S. public company and a year between 1980 and 2000⁵—that is, some students were assigned the same company, but no students were assigned the same company *and* the same year. The students were asked to forecast sales growth and operating margin for their assigned company for the subsequent three years. The students based their forecasts on the following information: industry name, firm sales growth and operating margin for the previous three years, historical and three-year prospective industry average growth and margins, and certain macroeconomic historical and three-year forecast data (real GNP growth, inflation rates, and the prevailing Treasury-bill yield). To avoid biasing the forecasts based on subsequent known outcomes, students were given the name of their firm's industry but not the firm's name. For the same reason, students were not given the identity of the current year. Responses were submitted electronically and anonymously. Forecast data from students who agreed to allow their responses to be used for research purposes were aggregated and analyzed. Summary statistics from the responses are presented in **Figure 3**.

The median values for the base-case forecast of expected sales growth and operating margin are plotted in **Figure 3**. The sales-growth panel suggests that students tended to expect growth to continue to improve over the forecast horizon (Years 1 through 3). The operating-margin panel suggests that students expected near-term performance to be constant, followed by later-term improvement. To benchmark the forecast, we compared the students' forecasts with the actual growth rates and operating margins realized by the companies. We expected that if students were unbiased in their forecasting, the distribution of the forecasts should be similar to the distribution of the actual results. **Figure 3** also plots the median value for the actual realizations. We observe that sales growth for these randomly selected firms did not improve but stayed fairly constant, whereas operating margins tended to decline over the extended term. The gap between

⁵More precisely, the population of sample firms was all U.S. firms followed by Compustat and the Value Line Investment Survey. To ensure meaningful industry forecast data, we required that each firm belong to a meaningful industry (i.e., multiform, industrial services, and diversified industries were not considered). We also required that Value Line report operating profit for each firm. To maintain consistency in the representation of firms over time, the sample began with a random identification of 25 firms per year. The forecast data were based on Value Line forecasts during the summer of the first year of the forecast. All historical financial data were from Compustat.

FIGURE 3 | Median expected and actual financial-forecast values for a random sample of U.S. companies. This figure plots the median forecast and actual company realization for sales growth and operating margin over the three-year historical period and the three-year forecast period based on the responses from MBA students in an experiment.

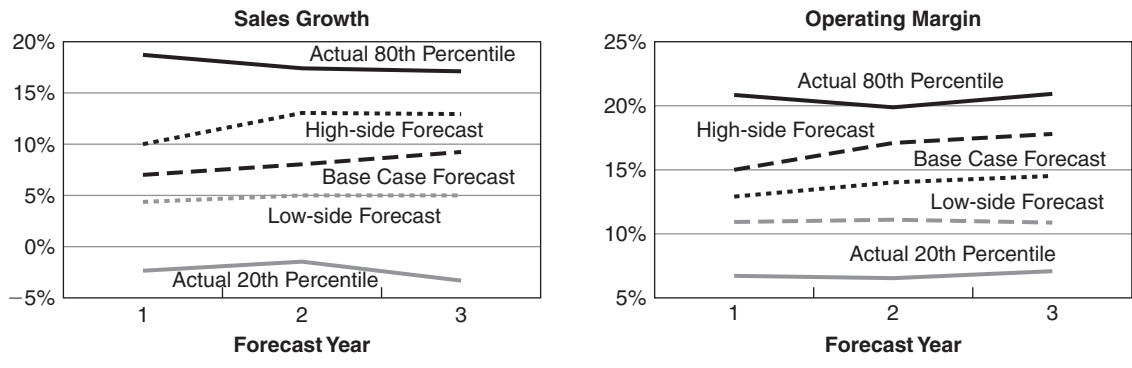


the two lines represents the systematic bias in the students' forecasts. Because the bias in both cases is positive, the results are consistent with systematic optimism in the students' forecasts. By the third year, the optimism bias is a large 4 percentage points for the sales-growth forecast and almost 2 percentage points for the margin forecast.

Although the average student tended to exhibit an optimistic bias, there was variation in the bias across groups of students. The forecast bias was further examined across two characteristics: gender and professional training. For both sales growth and operating margin, the test results revealed that males and those with professional backgrounds outside finance exhibited the most optimistic bias. For example, the bias in the third-year margin forecast was 0.7% for those with professional finance backgrounds and 1.9% for those outside finance; and 2.6% for the male students and just 0.8% for the female students.

In generating forecasts, it is also important to have an unbiased appreciation for the precision of the forecast, which is commonly done by estimating a high-side and a low-side scenario. To determine whether students were unbiased in appreciating the risk in forecast outcomes, they were asked to provide a high-side and a low-side scenario. The high-side scenario was defined explicitly as the 80th percentile level. The low-side scenario was defined as the 20th percentile level. **Figure 4** plots the median high-side and low-side scenarios, as well as the expected base-case forecast presented in **Figure 3**. For the three-year horizon, the median high-side forecast was 4 percentage points above the base case and the low-side forecast was 4 percentage points below the base case. The actual 80th percentile performance was 8 percentage points above the base case and the actual 20th percentile was 12 percentage points below the base case. The results suggest that the true variance in sales growth is substantially greater than that estimated by the students. The same is also true of the operating margin. The estimates provided by the students are consistent with strong overconfidence (negative variance bias) in the forecast.

FIGURE 4 | Median base-case, high-side, and low-side forecasts versus the actual 20th and 80th performance percentiles for sales growth and operating margin. This figure plots the median base-case, high-side, and low-side forecasts for sales growth and operating margin over the three-year forecast period based on the responses from MBA students in an experiment. The actual company 20th and 80th performance percentiles for sales growth and operating margin are also plotted. In the experiment, the low-side and high-side performance levels were defined as the students' belief in the 20th and 80th percentile levels.



Maytag: An Example

The Maytag Corporation is a \$4.7-billion home- and commercial-appliance company headquartered in Newton, Iowa. Suppose that in early 2004 we need to forecast the financial performance of the Maytag Corporation for the end of 2004. We suspect that one sensible place to start is to look at the company's performance over the past few years. The company's annual report provides information from its income statement and balance sheet (**Exhibit 1**).

One approach is to forecast each line item independently. Such an approach, however, ignores the important relationships among the different line items (e.g., costs and revenues tend to grow together). To gain an appreciation for these relationships, we calculate a variety of ratios, from sales growth to return on assets (**Exhibit 1**). In calculating the ratios, we notice some interesting patterns. First, sales growth declined sharply in 2003, from 11.5% to 2.7%. The sales decline was also accompanied by a decline in profitability margins; operating margin declined from 7.7% to 4.8%. Meanwhile, the asset ratios showed modest improvement; total asset turnover improved only slightly, from 1.5 \times to 1.6 \times . The steadiness of asset turnover was relatively constant across the various classes of assets (e.g., inventory days improved slightly in 2003, from 46.7 days to 43.5 days; PPE turnover also improved slightly, from 4.4 \times to 4.6 \times). The picture suggests that in 2003 Maytag experienced eroding sales growth and margins, while improvements in current asset efficiency kept asset turnover constant. Because return on assets comprises both a margin effect and an asset-productivity effect, we can attribute the 2003 decline in return on assets wholly to Maytag's margin decline. To be even more precise, because the operating expense as a percentage of sales actually

declined, the margin (and ROA) decline is actually wholly due to a decline in gross margin. The historical-ratio analysis gives us some sense of the trends in business performance.

A common way to begin a financial forecast is to extrapolate current ratios into the future. For example, a simple starting point would be to assume that the 2003 financial ratios hold in 2004. If we make that simplifying assumption, we generate the financial forecast presented in **Exhibit 2**. We recognize this forecast as naïve, but it provides a “straw-man” forecast with which the relationships captured in the financial ratios can be scrutinized. In generating the forecast, all the line-item figures are built on the ratios used in the forecast. The ratios that drive the forecast are bolded in **Exhibit 2**. The financial line-item forecasts are computed as referenced to the right of each figure. The nonbolded ratios are computed as before. This forecast is known as a “financial model.” The design of the model is thoughtful. By linking the dollar figures with the financial ratios, the model can be easily adjusted to accommodate different ratio assumptions.

We now augment our model with qualitative and quantitative research on the company, its industry, and the overall economy. In early 2004, Maytag was engaged in an important company-wide effort to consolidate its divisional headquarters. Maytag was made up of five major business units: Maytag (major appliances), Amana (major appliances), Jenn-Air (kitchen appliances), Hoover (floor cleaning), and Dixie-Narco (vending-machine equipment). The company expected this initiative to save \$150 million in annual operating expenses. Maytag was also engaged in a plant-efficiency exercise. The company was introducing major new lines in its Maytag and Hoover units that it expected to compete with the best products in the industry.

The U.S. major-appliance industry had historically been made up of four primary players: General Electric, Whirlpool, Maytag, and Electrolux. Recently, these companies had experienced several challenges. First, the dramatic increase in steel prices, purportedly due to massive real investment in China, had increased industry production costs. Second, Asian manufacturers had begun to compete aggressively in their market. Third, products were becoming less easy to differentiate, leading to increased price competition. Tempering these effects, the buoyancy of the U.S. housing market had provided strong growth across the industry. Whirlpool had been particularly aggressive in its expansion efforts. In 2003, its sales growth was almost 11%, while operating margin was 6.8% and asset turnover was 1.7. In 2003, Whirlpool generated better ratios than Maytag across most dimensions.

Based on the business and environmental assessment, we take the view that Maytag will maintain its position in a deteriorating industry. We can adjust the naïve 2004 forecast (**Exhibit 3**) based on this assessment. We suspect that the increased entry by foreign competition and a stalling of the recent sales growth in the U.S. housing market will lead to zero sales growth for Maytag in 2004. We also expect the increased price competition and steel-price effect to lead to a further erosion of gross margins (to 16.0%). Although the company’s efforts to reduce overhead costs are under way, we expect that Maytag will not see any benefits from these efforts until 2005. Consequently, we estimate that operating expenses will return to their 2002 percentage of sales (13.8%). These assumptions give us an operating-margin estimate of 2.2%. We

expect the increased competition and housing-market decline to reduce Maytag's ability to work its current assets. We expect AR days to increase to 47.0, inventory turnover to decrease to 7.2 \times , and other-current-assets percentage to stay at 5%. Finally, we expect the productivity efforts to generate a small improvement in fixed-asset turnover. We project PPE turnover at 5.0 \times and other-noncurrent-asset turnover at 7.1 \times . These assumptions lead to an implied financial forecast. The resulting projected after-tax ROA is 2.2%. The forecast is thoughtful. It captures a coherent view of Maytag based on the company's historical financial relationships, a grounding in the macroeconomic and industry reality, and incorporation of Maytag's specific business strategy.

We recognize that we cannot anticipate all the events of 2004. Our forecast will inevitably be wrong. Nevertheless, we suspect that, by being thoughtful in our analysis, our forecast will provide a reasonable, unbiased expectation of future performance. **Exhibit 4** gives the actual 2004 results for Maytag. The big surprise was the substantial effect on sales growth and margin of an even more dramatic increase in steel prices. Maytag's realized sales growth was actually negative, and gross margin dropped from 22% and 18% in 2002 and 2003, respectively, to 14% in 2004. Our asset assumptions were fairly close to the outcome. Although we did not complete a high-side and a low-side scenario in this simple example, we can hope that, had we done so, we could have appropriately assessed the sources and level of uncertainty of our forecast.

EXHIBIT 1 | Financial Statements for Maytag Corporation (in millions of dollars)

	2002	2003
(1) Sales	4,666	4,792
(2) Cost of sales	3,661	3,932
(3) Gross profit	<u>1,005</u>	<u>860</u>
(4) Operating expenses	645	631
(5) Operating profit	<u>360</u>	<u>229</u>
(6) Accounts receivable	586	597
(7) Inventory	468	468
(8) Other current assets	268	239
(9) Net property, plant, & equipment	1,066	1,047
(10) Other noncurrent assets	<u>715</u>	<u>673</u>
(11) Total assets	3,104	3,024
Sales growth	11.5%	2.7%
Gross margin (3/1)	21.5%	17.9%
Operating exp/Sales (4/1)	13.8%	13.2%
Operating margin (5/1)	7.7%	4.8%
Receivable turnover (1/6)	8.0	8.0
Accounts receivable days (6/1*365 days)	45.9	45.5
Inventory turnover (2/7)	7.8	8.4
Inventory days (7/2*365 days)	46.7	43.5
Other current assets/Sales (8/1)	5.7%	5.0%
PPE turnover (1/9)	4.4	4.6
Other noncurrent asset turnover (1/10)	6.5	7.1
Total asset turnover (1/11)	1.5	1.6
Return on assets (5*(1-.35)/11)	7.5%	4.9%

Note: Although including both turnover and days ratios is redundant, doing so illustrates the two perspectives.

EXHIBIT 2 | Naïve Financial Forecast for Maytag Corporation (in millions of dollars)

	2002	2003	2004E	
(1) Sales	4,666	4,792	4,921	Sales03 * (1 + Sales growth)
(2) Cost of sales	3,661	3,932	4,038	Sales04 – Gross profit
(3) Gross profit	1,005	860	883	Sales04 * Gross margin
(4) Operating expenses	645	631	648	Sales04 * Operating exp/Sales
(5) Operating profit	360	229	235	Gross profit – Operating expenses
(6) Accounts receivable	586	597	613	Sales04 * AR days/365
(7) Inventory	468	468	585	Cost of sales/Inv turnover
(8) Other current assets	268	239	245	Sales04 * Other curr assets/Sales
(9) Net property, plant, & equipment	1,066	1,047	1,075	Sales04/PPE turnover
(10) Other noncurrent assets	715	673	691	Sales04/Other NC asset turnover
(11) Total assets	3,104	3,024	3,210	
Sales growth	11.5%	2.7%	2.7%	Estimate
Gross margin (3/1)	21.5%	17.9%	17.9%	Estimate
Operating exp/Sales (4/1)	13.8%	13.2%	13.2%	Estimate
Operating margin (5/1)	7.7%	4.8%	4.8%	
Receivable turnover (1/6)	8.0	8.0	8.0	
Accounts receivable days (6/1*365 days)	45.9	45.5	45.5	Estimate
Inventory turnover (2/7)	7.8	8.4	6.9	Estimate
Inventory days (7/2*365 days)	46.7	43.5	52.9	
Other current assets/Sales (8/1)	5.7%	5.0%	5.0%	Estimate
PPE turnover (1/9)	4.4	4.6	4.6	Estimate
Other noncurrent asset turnover (1/10)	6.5	7.1	7.1	Estimate
Total asset turnover (1/11)	1.5	1.6	1.5	
Return on assets (5*(1-.35)/11)	7.5%	4.9%	4.8%	

EXHIBIT 3 | Revised Financial Forecast for Maytag Corporation (in millions of dollars)

	2002	2003	2004E	
(1) Sales	4,666	4,792	4,792	Sales03 * (1 + Sales growth)
(2) Cost of sales	3,661	3,932	4,025	Sales04 – Gross profit
(3) Gross profit	1,005	860	767	Sales04 * Gross margin
(4) Operating expenses	645	631	661	Sales04 * Operating exp/Sales
(5) Operating profit	360	229	105	Gross profit – Operating expenses
(6) Accounts receivable	586	597	617	Sales04 * AR days/365
(7) Inventory	468	468	559	Cost of sales/Inv turnover
(8) Other current assets	268	239	239	Sales04 * Other curr assets/Sales
(9) Net property, plant, & equipment	1,066	1,047	958	Sales04/PPE turnover
(10) Other noncurrent assets	715	673	675	Sales04/Other NC asset turnover
(11) Total assets	3,104	3,024	3,048	
Sales growth	11.5%	2.7%	0.0%	Estimate
Gross margin (3/1)	21.5%	17.9%	16.0%	Estimate
Operating exp/Sales (4/1)	13.8%	13.2%	13.8%	Estimate
Operating margin (5/1)	7.7%	4.8%	2.2%	
Receivable turnover (1/6)	8.0	8.0	7.8	
Accounts receivable days (6/1*365 days)	45.9	45.5	47.0	Estimate
Inventory turnover (2/7)	7.8	8.4	7.2	Estimate
Inventory days (7/2*365 days)	46.7	43.5	50.7	
Other current assets/Sales (8/1)	5.7%	5.0%	5.0%	Estimate
PPE turnover (1/9)	4.4	4.6	5.0	Estimate
Other noncurrent asset turnover (1/10)	6.5	7.1	7.1	Estimate
Total asset turnover (1/11)	1.5	1.6	1.6	
Return on assets (5*(1 – .35)/11)	7.5%	4.9%	2.2%	

EXHIBIT 4 | Actual Financial Performance of Maytag Corporation
(in millions of dollars)

	2002	2003	2004
(1) Sales	4,666	4,792	4,722
(2) Cost of sales	3,661	3,932	4,062
(3) Gross profit	1,005	860	660
(4) Operating expenses	645	631	625
(5) Operating profit	360	229	35
(6) Accounts receivable	586	597	630
(7) Inventory	468	468	515
(8) Other current assets	268	239	300
(9) Net property, plant, & equipment	1,066	1,047	921
(10) Other noncurrent assets	715	673	653
(11) Total assets	3,104	3,024	3,019
Sales growth	11.5%	2.7%	-1.5%
Gross margin (3/1)	21.5%	17.9%	14.0%
Operating exp/Sales (4/1)	13.8%	13.2%	13.2%
Operating margin (5/1)	7.7%	4.8%	0.7%
Receivable turnover (1/6)	8.0	8.0	7.5
Accounts receivable days (6/1*365 days)	45.9	45.5	48.7
Inventory turnover (2/7)	7.8	8.4	7.9
Inventory days (7/2*365 days)	46.7	43.5	46.3
Other current assets/Sales (8/1)	5.7%	5.0%	6.4%
PPE turnover (1/9)	4.4	4.6	5.1
Other noncurrent asset turnover (1/10)	6.5	7.1	7.2
Total asset turnover (1/11)	1.5	1.6	1.6
Return on assets (5*(1 - .35)/11)	7.5%	4.9%	0.8%

The Financial Detective, 2005

Financial characteristics of companies vary for many reasons. The two most prominent drivers are industry economics and firm strategy.

Each industry has a financial norm around which companies within the industry tend to operate. An airline, for example, would naturally be expected to have a high proportion of fixed assets (airplanes), while a consulting firm would not. A steel manufacturer would be expected to have a lower gross margin than a pharmaceutical manufacturer because commodities such as steel are subject to strong price competition, while highly differentiated products like patented drugs enjoy much more pricing freedom. Because of unique economic features of each industry, average financial statements will vary from one industry to the next.

Similarly, companies *within* industries have different financial characteristics, in part, because of the diverse strategies that can be employed. Executives choose strategies that will position their company favorably in the competitive jockeying within an industry. Strategies typically entail making important choices in how a product is made (e.g., capital intensive versus labor intensive), how it is marketed (e.g., direct sales versus the use of distributors), and how the company is financed (e.g., the use of debt or equity). Strategies among companies in the same industry can differ dramatically. Different strategies can produce striking differences in financial results for firms in the same industry.

The following paragraphs describe pairs of participants in a number of different industries. Their strategies and market niches provide clues as to the financial condition and performance that one would expect of them. The companies' common-sized financial statements and operating data, as of early 2005, are presented in a standardized format in **Exhibit 1**. It is up to you to match the financial data with the company descriptions. Also, try to explain the differences in financial results *across* industries.

This case was prepared by Sean Carr, under the direction of Robert F. Bruner. It was written as a basis for class discussion rather than to illustrate effective or ineffective handling of an administrative situation. Copyright © 2005 by the University of Virginia Darden School Foundation, Charlottesville, VA. All rights reserved. *To order copies, send an e-mail to sales@dardenbusinesspublishing.com. No part of this publication may be reproduced, stored in a retrieval system, used in a spreadsheet, or transmitted in any form or by any means—electronic, mechanical, photocopying, recording, or otherwise—without the permission of the Darden School Foundation.*