Lecture XIII: Profitability and Asset Management

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Decomposing Profitability

- Every decision in the farming operation has an impact on the return on equity.
- Financial performance measurement typically simplifies the analysis by decomposing the return on equity into operating and financing parts.

The DuPont Identity of Return on Equity

- The DuPont Identity aims to understand the components of operations and financing decisions that compose the return on equity.
- This helps to simplify the analysis of the financial performance of the firm and improve decision making concerning operations and finance.

$$\begin{aligned}
&\text{Return on Equity} = \text{Earn} \times \text{Turns} \times \text{Leverage} \\
&= \text{Operating Profit Margin} \times \text{Asset Turnover} \times \text{Leverage} \\
&= \underbrace{\frac{\text{Operating Income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Average Total Assets}}}_{\text{Operating Return on Assets}} \times \\
&\underbrace{\frac{\text{Average Total Assets}}{\text{Average Owner's Equity}} \times \frac{\text{Net Income}}{\text{Operating Income}}}_{\text{Financial Leverage}}
\end{aligned} \tag{1}$$

Earns

- Earns refers to the **operating profit margin** of the firm.
- The operating profit margin is computed by dividing operating profit by sales.
- Both of these numbers are found on the income statement.
- Because the operating profit margin is typically expressed as a percentage, we multiply the resulting decimal by 100.
- From Table 4.1 – All Indiana farms

$$\text{Operating Profit Margin} = \frac{20,849}{129,115} \times 100.0 = 16.1\%. \quad (2)$$

- This means that for every dollar of revenue generated, 16.1 cents is used to pay interest expense and compensate equity holders.
- All other things equal - higher operating margins are preferred to lower.
- Notice that the operating margin is somewhat higher for younger Indiana farmers (27.4 %).
- Managers can improve profit margins in at least three key ways:
  - increase prices,
  - reduce average fixed costs per unit by increasing units sold, or
  - decrease variable costs.
- The profit margin focuses primarily on the relationship between revenues and costs.

Turns

- Turns refers to the asset turnover of the firm.
- The **asset turnover ratio**is calculated by dividing average assets by the firm's revenues

$$\text{Asset Turnover Ratio} = \frac{\text{Revenues}}{\text{Average Total Assets}} \tag{3}$$

- For all Indiana farms:

$$\text{Asset Turnover Ratio} = \frac{62,001}{\frac{1}{2}(965,531 + 851,566)} = 0.142. \tag{4}$$

- Historically, the farm sector has suffered from a low asset turnover ratio.
  - First, some fairly expensive farm equipment is used for short periods of time (i.e., combines may be used for one or two months per year).
  - Second, the low asset turnover ratio may be largely a function of the dominance of farmland on the agricultural balance sheet.
- These considerations are usually referred to as the **asset specificity** and **capital intensity** of an industry.

Operating Return on Assets

- The *operating return on assets* (OROA) measures the profit that the firm is able to generate for every dollar of assets.
- It can be equivalently defined by the earns (the profit margin) times the turns (asset turnover ratio)

$$\begin{aligned}\text{Operating Return on Assets} &= \text{Operating Profit Margin} \\ &\times \text{Asset Turnover}\end{aligned} \tag{5}$$

or the return on assets divided by the average asset level

$$\text{Operating Return on Assets} = \frac{\text{Operating Income}}{\text{Average Total Assets}} \times 100.0. \tag{6}$$

Ownership – Leverage

- The forgoing analysis actually develops the rate of return on assets

$$r_A = \frac{\text{Operating Income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Average Total Assets}} = \frac{\text{Operating Income}}{\text{Average Total Assets}} \tag{7}$$

- Given the profitability of the firm's assets – the question becomes what happens as this return is leveraged.
- As a first step - consider the leverage ratio

$$r_A \times \frac{\text{Average Total Assets}}{\text{Average Owner's Equity}} = \frac{\text{Operating Income}}{\text{Average Owner's Equity}} \tag{8}$$

- The remaining question is what is the relationship between Operating Income and Net Income – borrowing implies interest.

$$r_E = \frac{r_A - K\delta}{1-\delta}$$
$$\Rightarrow \frac{\text{Operating Income} - \text{Int. Rate} \times \text{Debt}}{\text{OperatingIncome}} \tag{9}$$

Profitability Ratios

- Profitability ratios refer to the ability of the firm to generate profits in normal operations.
- The gross profit margin is computed by subtracting the cost of goods sold from gross revenues and then dividing the result by gross revenues

$$\text{Gross Profit Margin} = \frac{\text{Gross Revenue} - \text{Cost of Goods Sold}}{\text{Gross Revenue}} \times 100.0. \quad (10)$$

- The gross profit margin indicates the portion of revenues left to cover interest expenses and compensate equity investors after input costs are paid.

Asset Management Ratios

- **Asset management ratios** concern the ability of management to produce sales and operating income from the assets.
- **Inventory turnover** is an asset management ratio that indicates how often during operations the average inventory stock is realized as revenue. This ratio is computed by dividing the cost of goods sold by the average inventory stock.

$$\text{Inventory Turnover} = \frac{74,191 + 3,599 + 3,637 + 14,181 + 12,658}{\frac{1}{2}\left[(7,764 + 47,941 + 8,208 + 2,708) + (6,318 + 39,232 + 8,170 + 2,157)\right]} = 1.768 \cdot \tag{11}$$