

## **Inventory Turnover**

The inventory turnover ratio is a common measure of the firm's operational efficiency in the management of its assets. As noted earlier, minimizing inventory holdings reduces overhead costs and, hence, improves the profitability performance of the enterprise. Ideally the inventory turnover ratio would be calculated as units sold divided by units on hand. However, the financial statements themselves will only capture monetary valuations and hence external evaluation of inventory turnover must rely on the valuation metrics recorded under GAAP, namely:

### **Inventory Turnover**

$$\frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} = \frac{\text{Cost of Goods Sold}}{(\text{Beginning Inventory} + \text{Ending Inventory})/2}$$

While it is theoretically superior to average the “snapshot” balance sheet amounts of inventory in order to benchmark Cost of Goods Sold for the entire year, some analysts simply utilize the ending inventory number for computational expediency – a minor inaccuracy for firms with relatively static year-to-year inventory levels.

### **✓ Reality Check – Computing Inventory Turnover**

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$$\begin{aligned}\text{Inventory Turnover} &= \frac{\text{COGS}}{\text{Average Inventory}} \\ &= \frac{1,172,646}{(1,060,164 + 1,214,622)/2} \\ &= 1.03\end{aligned}$$

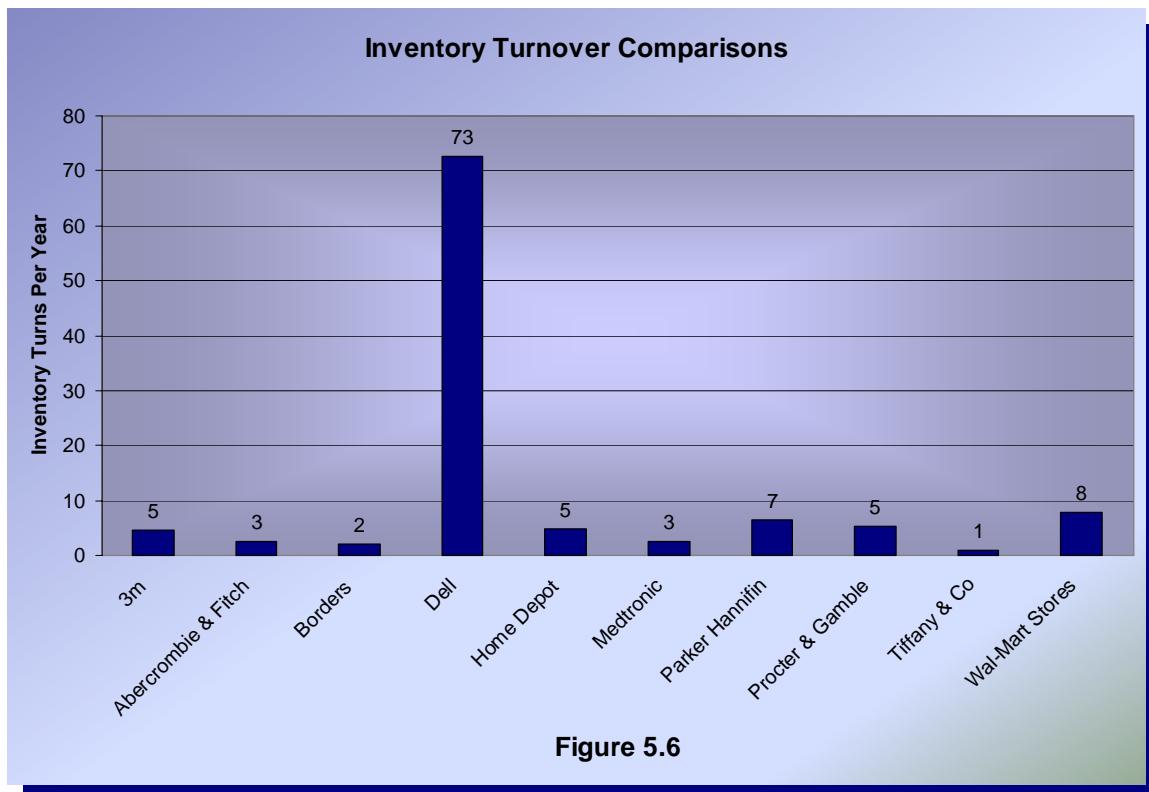
**Hint:** See page 5-7 for financial statement data.

The inventory turnover ratio is often interpreted as a measure of the number of times that the company sold through its inventory during the year. Thus, for example, an inventory turnover ratio of 4.0 indicates that the company sells through its stock of inventory each quarter – in other words, there is a three month supply of inventory on

hand. Indeed, the inventory turnover ratio is often inverted and multiplied by 360 to estimate the number of days sales sitting in inventory:

### Days Sales in Inventory

$$\frac{360}{\text{Inventory Turnover}} = \frac{\text{Average Inventory}}{(\text{Cost of Goods Sold})/360} = \frac{\text{Average Inventory}}{\text{Average Daily Sales at Cost}}$$



The inventory turnover ratio is often misestimated due to two computational flaws that are all too common even among publicly available online databases purporting to calculate reliable sets of financial performance ratios. These are:

1. Utilizing Sales Revenue rather than Cost of Goods Sold in the numerator.
2. Failing to account for the off-balance sheet LIFO Reserve in the denominator.

Both computational defects result in an overstatement of the true inventory turnover performance of the firm. Sales Revenue is measured at the selling price of the units sold while the Inventory numbers in the denominator are measured at cost. Thus,

including Sales Revenue in the numerator overstates the true number of units turned in the period by picking up the irrelevant impact of the firm's gross margin percentage. For LIFO firms the second computational flaw is extremely prevalent and can be even more severe than the first, since as we have seen the raw balance sheet inventory numbers can be severely understated because of the use of very old costs in their measurement.

A simple example using recent financial data for Olin Corporation will illustrate these points. For the year ended December 31, 2006 Olin Corporation reported Sales of \$3,151.8 million and Cost of Goods Sold of \$2,823.0 million. Inventory balances on the balance sheet were \$263.3 and \$262.6 million as of December 31, 2006 and 2005, respectively. Reproduced here is a portion of the Inventories footnote from Olin's financial statements. Also reproduced is an excerpt from the Fundamental Ratio data published by Thomson Research – one of the most popular and extensive publicly available financial databases.

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**Fundamental Ratios**

FISCAL YEAR ENDING	12/31/06	12/31/05
QUICK RATIO	1.51	1.63
CURRENT RATIO	2.25	2.38
SALES/CASH	11.40	7.76
SG & A/SALES	0.05	0.07
RECEIVABLES TURNOVER	9.31	7.99
RECEIVABLES DAYS SALES	38.68	45.04
<b>INVENTORIES TURNOVER</b>	<b>11.97</b>	<b>8.98</b>
INVENTORIES DAYS SALES	30.07	40.10

**INVENTORIES**

(in millions)	December 31,	
	2006	2005
Supplies	\$ 38.2	37.1
Raw materials	293.7	\$ 172.0
Work-in-process	206.3	180.7
Finished goods	151.8	112.5
	690.0	502.3
LIFO reserves	(426.7)	(239.7)
	\$ 263.3	\$ 262.6

Inventories valued using the LIFO method comprised 78% and 79% of the total inventories at December 31, 2006 and 2005, respectively. If the FIFO method of inventory accounting had been used, inventories would have been \$426.7 and \$239.7 higher than that reported at December 31, 2006 and 2005, respectively.

Olin's reported inventory turnover rate of 11.97 is, on its face, impressively high – especially when compared to those of other manufacturing companies illustrated in Figure 5.6 on page 5-27. However, it was computed using both Sales Revenue in the numerator and the balance sheet LIFO Inventory amounts in the denominator:

$$\text{Inventory Turnover} = \frac{\text{Sales}}{\text{Ending Inventory}} = \frac{3,151.8}{263.3} = 11.97$$

A far more accurate measure of true inventory turnover (in units) would utilize the *Cost of Goods Sold* in the numerator and measure Inventory at its *current* cost (i.e., by adding back the off-balance sheet LIFO reserve). Making these adjustments cuts the measurement of the inventory turnover ratio by a factor of 3 and brings Olin much more in line with typical manufacturing firms:

$$\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Ending Inventory} + \text{LIFO Reserve}} = \frac{2,823.0}{263.3 + 426.7} = \frac{2,823.0}{690.0} = 4.09$$