

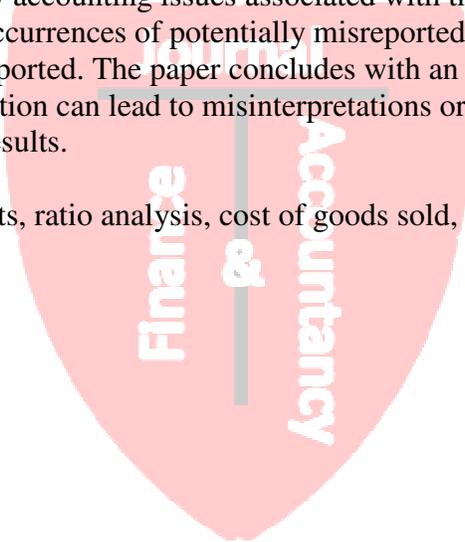
## Analyzing financial statements with potentially misreported cost of goods sold figures

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### Abstract

The analysis of a company's financial statements, whether it is for credit, investment, or any number of other potential purposes, relies heavily on the accounting data provided by the company in its financial reports. The Securities and Exchange Commission (SEC) and others have recently been demonstrating increased concerns over a variety of reporting topics, including the potential problems associated with the depreciation and amortization of assets used to generate a company's revenues not being correctly incorporated in the cost of goods sold figure reported on the income statement. This paper examines the potential risks associated with relying on such misreported data. Key accounting issues associated with the depreciation of operating assets are reviewed. Recent occurrences of potentially misreported depreciation data in current financial reporting are then reported. The paper concludes with an examination of how such misrepresentations of information can lead to misinterpretations or misleading conclusions about various companies reported results.

Keywords: financial statements, ratio analysis, cost of goods sold, absorption costing, SAB 11.b



## Introduction

The analysis of a company's financial statements, whether it is for credit, investment, or any number of other potential purposes, relies heavily on the accounting data provided by the company in its financial reports. The presentation of such data falls under the auspices of generally accepted accounting principles (GAAP) as prescribed in the U.S. by the SEC and the FASB (Financial Accounting Standards Board) and globally by the IASB (International Accounting Standards Board) through its IFRS (International Financial Reporting Standards). The accounting principles describe the proper procedures for recording and reporting economic activities undertaken by various entities.

In recent times the SEC and others have become increasingly concerned about a variety of reporting topics. Their stance is that when companies deliberately or mistakenly misrepresent the results of their operations, analysts can make incorrect conclusions about those operations. Included among these concerns is the possible misrepresentation of results that can occur when the depreciation of assets used to generate a company's revenues are not incorporated in the cost of goods sold figure reported on the income statement. (Note the term depreciation actually represents both depreciation of fixed assets and amortization of assets utilized under capitalized leases). This can lead to erroneous interpretations of the relative strengths and weaknesses in a company's activities when using assessment tools such as common-sized financial statements and financial ratios that are based on the accounting figures reported.

## Depreciation and the Cost of Sales

Before examining the potential problems of misreported data, a review of the accounting guidelines for depreciating operating assets is in order. It is dictated by the mundane concept of absorption accounting, the costing method required under both U.S. GAAP and the IFRS. Absorption costing involves assigning a standard overhead rate that is included when calculating manufacturing overhead costs. This cost rate is applied to the total units of inventory that is produced during a specific time period. As inventory is produced, the depreciation of the operating assets used to manufacture inventory items is transferred from a manufacturing overhead account into the work-in-process inventory. As the work-in-process inventory is completed and sold, a proportional amount of the depreciation expense is then transferred to the finished goods inventory and ultimately to the cost of goods sold (AIPB, n.d.).

The main justification for using absorption costing is that it follows one of the basic tenets of financial accounting: the matching principle. Fixed manufacturing costs like depreciation are incurred as part of the process of generating or producing inventory. Therefore, all direct and indirect costs of producing inventory are to be matched against any revenues that are generated from the sale of that inventory (Martin, n.d.).

Although absorption costing offers a great deal of credibility to a company's financial statements, there are potential abuses. For example, by purposefully increasing the production of inventory disproportionately to the anticipated growth in sales of that inventory, a company can increase its profits by moving fixed costs like depreciation from the income statement to the balance sheet where it is situated in the unsold inventory. Furthermore, evaluating a company's profitability can become more difficult as changes in profits can occur from changes in the number of units sold, as well as from changes in the cost of goods sold that arise from absorbing fixed costs like depreciation into the units of inventory, a item that can have great variability

(Martin, n.d.). Similarly, difficulties can arise when evaluating a company's liquidity or its ability to control inventory costs that is often assessed through the use of financial ratios that are based on various inventory and cost figures.

### **SEC Concerns**

Although the advantages and disadvantages of using absorption accounting are known by knowledgeable analysts of financial statements, another problem can arise when reported results do not clearly follow the prescribed norms. The SEC has shown concern and begun commenting on the potential misallocation of depreciation expenses by individual companies (Deloitte, 2009). SEC Staff Accounting Bulletin Topic 11.B states that if the cost of sales excludes charges for depreciation of property, plant and equipment, the description of the line item within the income statement should explicitly disclose that the cost of goods sold indeed excludes depreciation that is separately reported (SEC, n.d.). It further goes on to state that depreciation, depletion and amortization should not be positioned in the income statement in a manner which results in reporting a figure for income before depreciation (i.e., gross profit). Most of the SEC staff's comments on this matter have stemmed from companies' lack of awareness or incorrect application of the guidance in SAB Topic 11.B, particularly their inappropriate reporting of an amount for gross profit before depreciation and amortization (Deloitte, 2009).

Examples of the SEC's concerns over this topic can be found on the SEC's website through its EDGAR (Electronic Data-Gathering, Analysis, and Retrieval) platform through which all forms required by the SEC are electronically filed. The SEC's comments to and the responses from filers regarding a variety of financial reporting issues can be located through the platform under the moniker of "type=corresp". Numerous examples of such correspondence between the SEC and different entities regarding the possible misreporting of depreciation expenses are found there, as in the cases of Active Power, Inc., Reliance Steel & Aluminum Co., and ENSCO International, Inc. (SEC, 5/21/08; 10/21/09; 10/27/09). Although the wording in each case differs, the questions posed by the SEC are typically as follows:

We note that you present a gross profit measure. However, it appears that your cost of sales amount excludes depreciation and amortization expense. Pursuant to SAB Topic 11B, in order to avoid placing undue emphasis on "cash flow," depreciation and amortization should not be positioned in the income statement in a manner that results in reporting a figure for income before these expenses. If you choose to continue to present a gross profit measure, please revise to allocate the appropriate amount of depreciation and amortization expense to cost of sales. Also, conform disclosures in regard to gross profit in MD&A and quarterly results accordingly. If you choose not to present a gross profit measure and cost of sales continues to exclude depreciation and amortization, continue to describe cost of sales as exclusive of these expenses. (SEC, 10/21/09).

### **Problems for Financial Statement Analysis**

Financial statement analysis focuses on evaluating the results found in a company's annual reports. The analysis is conducted to help assess an entity's historical and prospective financial performance. It is a complex endeavor, given that financial statements contain large amounts of information that are based on very complex and constantly changing accounting

policies. For example, GAAP reporting rules often allow for significant amounts of management discretion, giving management the ability to hide or omit key information.

Different analysts will focus on different criteria. Creditors will be concerned with a company's ability to make short-term and long-term payments on borrowed funds. Investors will focus more on profitability figures and evaluating the soundness of current or prospective investments. Company management can use information derived from financial reports to help it assess how well it has performed and provide information as to why; this allows it to scrutinize those activities that did or did not contribute to their success. It is likely a safe assumption that company management would have advantages over external users of financial statements in analyzing a company's financial condition. Company management would have access to unreported data as well as have a better understanding of how the financial reports were generated. (There may still be breakdowns in the internal controls associated with financial reporting that could cause problems for management in assessing its results but that topic is beyond the scope of this analysis). Therefore, it is the external analysts who would be most concerned should there be any misreported results, whether done intentionally or accidentally.

Among the commonly used tools for analyzing financial statements are common-sized statements and financial ratio analysis. Common-sized statements provide a way to compare companies of vastly different sizes, whether defined in terms of total sales or total assets. There are two generic types. Vertical analysis expresses each individual financial statement item as a relative percentage of one key (or base) variable, usually total sales revenue for income statement items and total assets for balance sheet items. It provides information for comparing the relative size of different balance sheet or income statement components across companies and/or across time. A related method, horizontal analysis, expresses each item as a relative percentage of that same item in some base or earlier time period. This helps provide information regarding trends in the make-up of the balance sheet and income statement.

Financial ratio analysis involves calculating and interpreting various measures defining relationships between balance sheet items (e.g., the current ratio, which compares current assets to current liabilities), between income statement items (e.g., the net profit margin, which relates net profits to total sales), and between different balance sheet and income statement items (e.g., total asset turnover, which is total sales revenue divided by average total assets). The calculation of ratios provides a standardized means of comparing various relationships of income statement and balance sheet items across companies of different sizes (cross-sectional analysis) and across different time periods (trend or time series analysis).

To the extent that balance sheet and income statement accounts are truly measured and reported according to generally accepted accounting principles, common-sized statements and financial ratio analysis can provide much valued insights into the strengths and weaknesses of companies. The degree to which reported results stray from GAAP can lead external users of financial statements to question their analysis of those results. And those not aware of such deviations from GAAP may make erroneous conclusions based on their analyses of those results.

The depreciation of operating assets affects many different aspects of the financial statements. To the extent it is related to the production of inventory, it affects both the value of the inventory reported on the balance sheet and the cost of goods sold reported on the income statement. If there are deviations from GAAP, such deviations can result in inaccurately valued inventory and cost of goods sold. These in turn can potentially lead to erroneous conclusions about the company as the information generated by common-sized statements and financial ratio analysis can be skewed either upwards or downwards.

For example, common-sized income statements can be used to examine cross-sectional and trend relationships between a company's sales, its cost of sales, and the differential between the two, gross profits. If a company's depreciation expenses are not included in its cost of goods sold as required by GAAP, any analysis of the company's results may be faulty, particularly if one relies on comparative industry averages reported by external entities. In fact, this may even be its own unique part of the problem. For example, Standard & Poor's, a leading provider of financial data through its Compustat database, specifically removes depreciation expense from cost of goods sold before deriving gross profits (Standard & Poor's, 2003). Another commonly used database used in securing industry-level data, the RMA Annual Statement Studies, does not mention that it makes any such adjustments. Thus, when using the Compustat database, the cost of goods sold would be expected to be understated, and gross profits overstated, relative to any assessment made directly from the company's financial statements found in its annual report.

Furthermore, any financial ratio based on the cost of goods sold figure may be difficult to interpret. For example, the gross profit margin is defined as sales minus cost of goods sold divided by sales. In its May 2010 annual report, General Mills reported sales of \$14,796.5 million and cost of sales of \$8,922.9 million, leaving a gross profit of \$5,873.1 million and a gross profit margin of 39.7 percent. Yet the figures reported in the Compustat database, which removes depreciation expenses from the reported cost of goods sold, shows cost of goods sold of \$8,417.8 million, resulting in gross profits of \$6,378.7 million and a gross profit margin of 43.1 percent. Without understanding the role that depreciation plays in inventory costing, analysts may make incorrect assessments about the company's results. Comparing the gross profit results reported by General Mills in its financial statements against industry or peer averages generated by the Compustat database that removes depreciation expense from cost of goods sold before calculating gross profits could easily lead analysts not aware of this discrepancy to conclude that the company's gross profit margin is underperforming when compared to those of its peers.

There are other financial ratios that could be similarly misinterpreted. Inventory turnover and days' sales in inventory are two common ratios used to examine a company's ability to control its inventory costs. Inventory turnover is defined as cost of goods sold divided by average inventory. Days' sales in inventory is defined as average inventory divided by daily cost of goods sold, with daily cost of goods sold calculated as total cost of goods sold divided by 365 days. To the extent that the cost of goods sold figure does not include the associated depreciation, inventory turnover would be lower and days' sales in inventory would be higher. This could lead analysts to conclude that the company is less efficient managing its inventory and that the inventory is less liquid, two conclusions that may be incorrect. In the case of General Mills, where the difference between reported cost of goods sold and a cost of goods sold figure with depreciation removed is approximately \$500 million for a company with inventory levels around \$1,300 million, one can begin to appreciate the potential magnitude of the problem.

The analysis of many other ratios can be negatively affected by the inconsistent treatment of depreciation. For example, accounts payable turnover and days' sales in payables are similarly defined as the inventory ratios, simply replacing inventory figures with accounts payable. Moreover, composite ratios such as the cash conversion cycle include the days' sales in inventory and in payables figures so any erroneous conclusions filter through the analysis.

Even cash flow analytics, such as the price-to-cash flow multiple, cash flow per share, and cash flow margin (i.e., cash flow generated per dollar of sales) are not immune to such inconsistencies. Although the cash flow amount used in the ratios is generally the cash flow from operating activities figure taken from the statement of cash flows, it is often also proxied by

simply adding back depreciation expenses to reported net income (Standard & Poor's, 2003; Brigham & Ehrhardt, 2011). Given the potential impact of other noncash adjustments to earnings (e.g., deferred taxes, gains and losses on the disposal of assets) and to the accrual accounting adjustments for various current asset and current liability items associated with the generation of sales, the differences between the two cash flow measures can be large and compounded by the problems associated with the cost absorption accounting rules described earlier.

There are also potential discrepancies when one follows GAAP in constructing a cash flow statement and in turn determining cash flow from operating activities. Using the indirect method of presenting the cash flow statement, one must adjust reported net income for various non-cash expense and revenue items such as depreciation. What is not apparent is whether the amount added back is the amount of depreciation expensed or if it is the amount incurred (Drtna & Largey, 1985). In many cases such as with merchandising companies, this is not an issue as the two depreciation amounts are the same. But for manufacturing companies, the depreciation of assets is recapitalized within the work-in-process and finished goods inventories and then later expensed as cost of goods sold when the inventory is sold. Therefore, the amount of depreciation expensed during a specified reporting period can differ from the amount incurred. The difference between the two amounts can be significant if the company has large inventories or if depreciation is a large component of manufacturing costs (Nurnberg, 1989).

The impact that such differences would have on company assessments can be widespread, from minimal to dramatic (Fairfield, Whisenant & Yohn, 2003; Francis & Smith, 2005). A hypothetical example can provide some insights into the extent of the problem. Assume XYZ Corporation calculates 2009 depreciation of \$1,000,000, with 90 percent of the depreciation related to manufacturing operations and 10 percent to non-operating assets. \$900,000 of the expense is therefore related to the production of inventory with the remaining \$100,000 expensed as part of general and administrative expenses. During the year XYZ sells 75 percent of the goods produced during the year. Of the remaining unsold inventory forty percent is in finished goods awaiting sale with the residual amount remaining in the production process.

Of the \$900,000 depreciation expense charged to inventory, \$675,000 (75%) would be charged against 2009 earnings as a component of the cost of goods sold. The remaining \$225,000 remains in inventory, \$90,000 (40%) in the finished goods inventory and \$135,000 (60%) in the work in process inventory. Therefore, only \$775,000 of the total depreciation expense is actually charged against 2009 income with \$225,000 of the cost remaining in inventory, where it will remain there until the inventory is sold.

## Data and Analysis

To gain a sense of the potential impact such discrepancies could have on the analysis of financial statements, a sampling of industry groups was chosen from the Compustat database. The sample began with all companies reporting positive values for depreciation, raw materials inventory, work-in-process inventory, and finished goods inventory using Compustat data through July 30, 2010. From this sample, two industries, Pharmaceutical Preparation Manufacturing (NAICS Code 325412) and Semiconductor and Related Device Manufacturing (NAICS Code 334413), were selected because they had the largest number of companies (71 and 80, respectively) represented. Summary statistics on selected financial statement data for these two industries are found in Table 1 (Appendix). Industry means and medians are both reported. The means are based on winsorized data to minimize the impact of outliers, particular the

influence of some of the extremely large companies in the samples such as Johnson & Johnson and Intel (Frecka & Hopwood, 1983; Nenide, Pricer & Camp, n.d.).

The data in Table 1 show that the potential problems can be profound, particularly for the companies in the semiconductor manufacturing sector. For both sectors, total depreciation expenses were well over ten percent of total cost of goods sold. And depreciation expenses were around one-third of total inventory for pharmaceutical firms and over one-half for semiconductor firms. Of course, within these industry averages, individual companies showed wide-ranging differences in how depreciation expenses affected their overall inventory costing results, in some cases only mildly, even negligibly, but sometimes almost grotesquely.

More relevant is the effect that removing depreciation expenses from the cost of goods sold has on calculating financial ratios. As Table 2 (Appendix) documents, the mean gross profit margin for semiconductor manufacturers was 35.6 percent using reported financial statement data, but this amount increases to 43.8 percent when using Compustat data in which the depreciation expenses are removed from cost of goods sold. The averages for pharmaceutical companies also increase from 45.1 to 54.8 percent. In both cases, gross profit margins are overstated by more than twenty percent.

Inventory ratios demonstrate comparable results. For example, the mean days' sales in inventory for semiconductor manufacturers was 87.8 days using as-reported data but 103.7 days when excluding depreciation from cost of goods sold. For pharmaceuticals, the amount increased from 108.4 to 134.8 days. Days' sales in inventory is thus significantly overstated (and the liquidity of the inventory understated) when depreciation is removed from cost of goods sold.

Even the potentially insidious impact on cash flow numbers can be significant. As Table 3 (Appendix) shows, there are significant differences when identifying cash flow as cash flow from operations versus the proxy of adding back depreciation to net income. For example, the mean cash flow from operations amount for semiconductor manufacturers was \$95.9 million while it was only \$43.7 million when using the proxy method. This difference actually reverses itself for pharmaceuticals that reported a mean cash flow from operations of \$411.7 million and a mean of \$448.7 million with the proxy amounts. This results in vastly different figures for the cash flow margin and other ratios using cash flow as a variable.

Compounding the problem is the issue of depreciation expenses remaining in the finished goods and work-in-process inventories. Again the impact can vary across industries, not to mention individual companies. In the past year the average semiconductor company saw its inventory fall by \$21.0 million. This improves cash flow by having additional depreciation expense (to the extent that prior expenses had been absorbed during the production process) to add back to net income. Yet pharmaceutical companies show the opposite effect as they had an average increase in inventories of \$21.1 million, in which case some of the depreciation incurred was absorbed or capitalized as part of the inventory valuation. But this can cause problems in analysis because depreciation in itself does not have any direct impact on cash flows, only the way they are reported through the cash flow statement and then evaluated using various cash-flow-based ratios. This problem is inherent in the indirect method of reporting cash flow from operating activities, a topic best left for a separate paper.

Although industry-wide figures help demonstrate the potential breadth of the problem, a review of the results of individual companies can provide even more profound examples. For example, Advanced Micro Devices, a semiconductor manufacturer with total sales of \$5.4 billion, shows a 51 percent increase in gross profit margin (from 40.8 to 61.6 percent) and a 54 percent increase in days' sales in inventory (from 64.7 to 99.8 days) when depreciation expenses

are removed from cost of goods sold. And cash flow from operations was reported as \$473.0 million while the proxy cash flow measure would come in at a whopping \$1,507.0 million.

Another semiconductor company, Micron Technology, with total sales of \$4.8 billion, provides even more dramatic results. Using reported data its gross profit margin for the year was -9.1 percent. Yet if depreciation is removed from cost of goods sold the gross profit margin soars to 34.9 percent. The days' sales in inventory figure consequently rises from 68.7 days to 115.1 days. Reported cash flow from operations was \$1,206.0 million but the cash flow proxy is only \$278.0 million. Likewise, Mylan, Inc., a pharmaceutical company with total sales of \$5.1 billion, shows a similar 19 percent increase in gross profit margin (from 41.4 to 49.2 percent) and a 15 percent increase in days' sales in inventory (from 136.3 to 157.4 days). Its proxy cash flow amount of \$633.7 million exceeds its actual cash flow from operations amount of \$605.1 million with that differential likely the result of a \$48.2 million increase in inventory during the year.

## Summary

Financial statement analysis cannot be effectively conducted without reliable, consistent, and comparable data. There are many facets to GAAP that must be understood to properly evaluate the data generated by the accounting function. One facet is the depreciation of assets used in the production of a inventory, inventory that in turn becomes the primary source of a company's revenues. The SEC has demonstrated its concern in a limited, but not isolated, number of cases in which companies appear to circumvent the absorption costing principles. Given the evidence provided, it should be clear that without fully understanding the process by which depreciation expenses may or not be incorporated in a company's cost of goods sold, one is capable of making erroneous conclusions about a company's financial position.

There are potential problems when companies are not aware of these GAAP reporting requirements, not to mention those cases in which they may blatantly try to circumvent them. Uninformed analysts may also face problems when they are not fully aware of the ramifications to their analysis when databases such as Compustat arbitrarily shift depreciation expenses from the cost of goods sold to general operating expenses.

Inconsistency in financial statement data reporting can lead to erroneous analyses. When data are shifted (e.g., from cost of goods sold to operating expenses), financial ratios, important tools used in analyzing financial statements, can be altered. Several key ratios, from gross profit margin to days' sales in inventory, can be affected, often materially. Although depreciation is not by itself a cash flow, it nonetheless represents expenses that can affect evaluations of a company's financial performance. To the degree that discrepancies between the amount of depreciation expensed and the amount incurred can affect reported cash flow from operations, even cash-flow-based metrics used in investment and credit analysis can come under scrutiny. Analysts must be aware of these potential problems before placing undue emphasis on specific output from the process of analyzing financial statements. As in any endeavor, a proper understanding of the situation can lead to a better analysis and understanding of the results.

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## Appendix

Table 1  
Summary Statistics on Selected Financial Statement Data for the  
Semiconductor Manufacturing and Pharmaceutical Industries

		Sales	Cost of Goods Sold	Depreciation	Total Inventory	Depr/COGS	Depr/Inv	Inv/Sales
NAICS 334413 (Semiconductors)	Means*	\$656.7 m	\$345.6 m	\$66.7 m	\$81.7 m	19.3%	81.6%	12.4%
	Medians	\$213.3 m	\$107.4 m	\$15.9 m	\$34.6 m	14.8%	46.0%	16.2%
NAICS 325412 (Pharmaceutical)	Means*	\$2,107.3 m	\$527.0 m	\$100.2 m	\$263.0 m	19.0%	38.1%	12.5%
	Medians	\$130.1 m	\$52.0 m	\$5.5 m	\$16.2 m	10.5%	33.7%	12.4%

Source: Compustat database (Research Insight), July 30, 2010 update

Table 2  
Industry Gross Profit Margins and Days' Sales in Inventory Figures:  
As-Reported Data and With Depreciation Removed from Cost of Goods Sold

		Gross Profit Margin			Days' Sales in Ending Inventory		
		Gross Profits /Sales	Gross Profits ex-Depr/Sales	% Change	Inventory/Daily COGS	Inventory/Daily COGS ex-Depr	% Change
NAICS 334413 (Semiconductors)	Means*	35.6%	43.8%	23.2%	87.8 days	103.7 days	18.2%
	Medians	42.2%	49.7%	17.6%	102.3 days	117.5 days	14.8%
NAICS 325412 (Pharmaceutical)	Means*	45.1%	54.8%	21.5%	108.4 days	134.8 days	24.4%
	Medians	55.8%	60.0%	7.5%	102.9 days	113.6 days	13.8%

Source: Compustat database (Research Insight), July 30, 2010 update

Table 3  
Industry Cash Flow Estimates and Cash Flow Margins:  
As-Reported Data and With Depreciation Removed from Cost of Goods Sold

		Cash Flow Estimates		Potential Inventory Adjustment	Cash Flow Margin		
		Cash flow from operations	Income + depreciation		CFO	Income + depr	Income + depr + inv adj
NAICS 334413 (Semiconductors)	Means*	\$95.9 m	\$43.7 m	-\$21.0 m	14.6%	6.7%	9.9%
	Medians	\$21.9 m	\$7.9 m	-\$2.9 m	10.3%	3.7%	5.1%
NAICS 325412 (Pharmaceutical)	Means*	\$411.7 m	\$448.7 m	\$21.1 m	19.5%	21.3%	20.3%
	Medians	\$12.5 m	\$12.2 m	\$3.2 m	9.6%	9.4%	7.0%

Source: Compustat database (Research Insight), July 30, 2010 update