Introduction

- Inventory price levels keep on changing over time
- IFRS permits the following three cost formulas: specific identification, FIFO and weighted average cost
- US GAAP allows for all the above three including LIFO
- The analyst needs to be well versed with the various inventory valuation methods to evaluate the company’s performance and their effect on the financial statements and ratios,
Effect of Inflation on Inventory

- **First In First Out (FIFO)**
  - Inventory items purchased/manufactured first are sold first
  - **Effect of inflation**
    - In periods of rising costs, the ending inventory is higher while the costs assigned to units sold is lower
    - When inflation is falling ending inventory is lower while the cost of goods sold is higher

- **Weighted Average Cost**
  - Inventory items sold and those remaining in inventory are the same average age and cost
  - **Effect of inflation**
    - A mixture of older and newer inventory items is assumed to be sold and hence there is no effect of inflation

- **Last in First Out (LIFO)**
  - Inventory items purchased/manufactured most recently are sold first
  - **Effect of Inflation**
    - When costs are rising the ending inventory is lower and the COGS is higher
    - When costs are falling the ending inventory is higher and the COGS is lower
    - Income tax expense is lower under LIFO
Effect of Inflation on Inventory

- Companies will use either of the following systems to record changes to inventory
  - Perpetual Inventory System
    Inventory value and cost of sales are continuously updated to reflect purchases and sales
  - Periodic Inventory System
    Inventory values and cost of sales are determined at the end of the accounting period
- Under the periodic system the amount of cost of goods available for sale and ending inventory may be quite different for the WAC or the FIFO method.
- While under the perpetual system as the inventory values and cost of sales are continuously updated to reflect current purchases and sales and so no adjustments are made while comparing companies using the WAC or the FIFO method.
Case Study#1: Inflation using LIFO compared to FIFO

- Verbinski Pvt. Ltd. and Keira Entertainment are two companies in the same industry. However, Verbinski uses FIFO method for inventory accounting while Keira Entertainment uses LIFO accounting. Every year both the companies purchase 15,000 units of inventory. In the first year the base inventory is 2,500 units. This is bought for $10. The finished units are sold for $17. Sales increase by 12% per year while inflation is around 5% per year for the next five years.

- Calculate the end of year inventory, sales and cost of sales and gross profits for both the companies.
- Compute inventory turnover and profit margins.
- Discuss and compare the financial ratios.
Case Study#1: Inflation using LIFO compared to FIFO

• Solution# for Verbinski Pvt. Ltd. Using FIFO
  Inventory in year $T = 2,500 \times 10 \times (1.05)^{T-1}$
  Sales in year $T = 15,000 \times 17 \times (1.12)^{T-1} \times (1.05)^{T-1}$
  Purchases in year $T = 15,000 \times 10 \times (1.12)^{T-1} \times (1.05)^{T-1}$
  Cost of Sales in year $T = \text{Bgn Inventory} + \text{Purchases} - \text{Ending Inventory}$
  Gross Profits = Sales – Cost of Sales

• Solution# for Keira Entertainment using LIFO
  Inventory in year $T = 2,500 \times 10$ since inventory bought in Y1 are assumed to remain in inventory
  Sales in year $T = 15,000 \times 17 \times (1.12)^{T-1} \times (1.05)^{T-1}$
  Cost of Sales in year $T = 15,000 \times 10 \times (1.12)^{T-1} \times (1.05)^{T-1}$
  Gross Profits = Sales – Cost of Sales
Case Study#1: Inflation using LIFO compared to FIFO

• Solution# for Verbinski Pvt. Ltd. Using FIFO

<table>
<thead>
<tr>
<th>($)</th>
<th>Y1</th>
<th>Y2</th>
<th>Y3</th>
<th>Y4</th>
<th>Y5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ending Inventory</td>
<td>25,000</td>
<td>26,250</td>
<td>27,563</td>
<td>28,941</td>
<td>30,388</td>
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<tr>
<td>Sales</td>
<td>255,000</td>
<td>299,880</td>
<td>352,659</td>
<td>414,727</td>
<td>487,719</td>
</tr>
<tr>
<td>Cost of Sales</td>
<td>150,000</td>
<td>175,150</td>
<td>206,134</td>
<td>242,579</td>
<td>285,446</td>
</tr>
<tr>
<td>Gross Profits</td>
<td>105,000</td>
<td>124,730</td>
<td>146,525</td>
<td>172,148</td>
<td>202,273</td>
</tr>
</tbody>
</table>

• Solution# for Keira Entertainment using LIFO

<table>
<thead>
<tr>
<th>($)</th>
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<td>207,446</td>
<td>243,957</td>
<td>286,893</td>
</tr>
<tr>
<td>Gross Profits</td>
<td>105,000</td>
<td>123,480</td>
<td>145,213</td>
<td>170,770</td>
<td>200,826</td>
</tr>
</tbody>
</table>
Case Study#1: Inflation using LIFO compared to FIFO

• Solution# for Verbinski Pvt. Ltd. Using FIFO

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Inventory Turnover</td>
<td>6.0x</td>
<td>6.7x</td>
<td>7.5x</td>
<td>8.4x</td>
<td>9.4x</td>
</tr>
<tr>
<td>GPM</td>
<td>70.00%</td>
<td>71.21%</td>
<td>71.08%</td>
<td>70.97%</td>
<td>70.86%</td>
</tr>
</tbody>
</table>

• Solution# for Keira Entertainment using LIFO

<table>
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<tr>
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<th>Y4</th>
<th>Y5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory Turnover</td>
<td>6.0x</td>
<td>7.1x</td>
<td>8.3x</td>
<td>9.8x</td>
<td>11.5x</td>
</tr>
<tr>
<td>GPM</td>
<td>70%</td>
<td>70%</td>
<td>70%</td>
<td>70%</td>
<td>70%</td>
</tr>
</tbody>
</table>
Case Study#1: Inflation using LIFO compared to FIFO

- Solution#
  - Both companies have similar sales
  - However due to the use of LIFO by Keira the company has an increasing inventory turnover ratio. This might indicate that they have a more efficient inventory management system. Which is not true
  - Gross profit margins under FIFO is slightly higher as part of the cost of sales includes inventory purchased at an older price.
  - Hence it is very important while comparing companies to ensure that proper adjustments are made to the financial statements to account for the difference in inventory accounting systems.
LIFO Method

• The LIFO method provides income tax savings during inflationary periods.
• Lower income taxes translate into higher cash flows and makes the company more valuable.
• The – LIFO Confirmity rule requires that companies using LIFO for tax purposes must also use the LIFO method for financial reporting.
• Under an inflationary environment use of LIFO results in
  – Higher cost of sales
  – Lower gross profit margins
  – Lower Operating profits
  – Lower Income Tax expense
  – Lower Net Income
• The balance sheet consequences are as follows
  – Lower ending inventory
  – Lower working capital
  – Lower total assets, retained earnings and shareholder’s equity
• Some of the financial ratio effects are a lower current ratio, higher debt-to-equity and lower profitability ratios.
• All US companies are expected to comply with IFRS provisions and as a consequence companies using LIFO will have to restate their financial statements.
• Consequently there will be a rise in income tax liabilities in the year of transition.
LIFO Reserve

• LIFO reserve is the difference between the LIFO inventory carrying amount and the inventory amount that would have been reported if the FIFO method had been used.

• The LIFO reserve is added to the inventory balance reported on the balance sheet to compare it with companies using the FIFO method.

• Cost of sales is adjusted by subtracting the increase in LIFO reserve during the period.
Case Study#2: LIFO to FIFO conversion

- Black Perl Inc. uses LIFO to account for its inventory. To comply with IFRS requirements it has decided to use the FIFO method. Calculate the inventory values for the company. Also calculate the cost of goods and net income. Assume that income is taxed at 35%.

<table>
<thead>
<tr>
<th>($ )</th>
<th>2009</th>
<th>2008</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>15,240</td>
<td>12,230</td>
<td>10,005</td>
</tr>
<tr>
<td>Cost of Sales</td>
<td>11,430</td>
<td>9,210</td>
<td>7,610</td>
</tr>
<tr>
<td>Net Income</td>
<td>1,830</td>
<td>1,470</td>
<td>1,205</td>
</tr>
<tr>
<td>Inventories</td>
<td>2,440</td>
<td>1,960</td>
<td>1,600</td>
</tr>
<tr>
<td>LIFO Reserves</td>
<td>520</td>
<td>490</td>
<td>450</td>
</tr>
</tbody>
</table>
Case Study#2: LIFO to FIFO conversion

- **Solution#**

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<thead>
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<th>($)</th>
<th>2009</th>
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<tbody>
<tr>
<td>Inventories (under LIFO)</td>
<td>2,440</td>
<td>1,960</td>
<td>1,600</td>
</tr>
<tr>
<td>LIFO Reserve</td>
<td>520</td>
<td>490</td>
<td>450</td>
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<td>Inventories (under FIFO)</td>
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<tbody>
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<td>Cost of Sales (LIFO)</td>
<td>11,430</td>
<td>9,210</td>
</tr>
<tr>
<td>Less: Increase in Inventory</td>
<td>-30</td>
<td>-40</td>
</tr>
<tr>
<td>Cost of Sales (FIFO)</td>
<td>11,400</td>
<td>9,170</td>
</tr>
</tbody>
</table>
Case Study#2: LIFO to FIFO conversion

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<tr>
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<th>2008</th>
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<tbody>
<tr>
<td>Net Income (LIFO)</td>
<td>1,830</td>
<td>1,470</td>
</tr>
<tr>
<td>Reduction in COS</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>Taxes on increased operating profit</td>
<td>-10.5</td>
<td>-14</td>
</tr>
<tr>
<td>Net Income (FIFO)</td>
<td>1,849.5</td>
<td>1,496</td>
</tr>
</tbody>
</table>
LIFO Liquidation

- Number of units sold exceeds the number of units purchased or manufactured, then the number of units in ending inventory is lower than the number of units in beginning inventory.
- A company which uses LIFO to account for its inventory will notice a LIFO liquidation.
- If prices are increasing then a LIFO liquidation will result in an increase in gross profits which will be produced through an inventory-related increase.
- This occurs because older lower priced inventory is being sold. This might be used by management to improve the gross profit margins of the company.
- A LIFO liquidation can also occur due to reasons outside the management control like
  - Economic recession
  - Labor strike
- An analyst should always review the footnotes to determine if LIFO liquidation has occurred.
Inventory Method Changes

- IFRS states that a change in inventory valuation method is only acceptable if it results in a financial statement providing reliable and more relevant information about the effects of the transaction, or conditions on the business entity’s financial position, financial performance or cash flows.
- The change can be applied retrospectively and comparative information for prior periods can be restated.
- An exemption to the restatement can be made if it is impracticable to determine the period-specific effects or the cumulative effect of the change.
- Under US GAAP the conditions to make an accounting change are similar. However a more comprehensive explanation is required to justify the superiority of the adopted method.
- Financial statements are restated similar to IFRS, however if the company is changing its accounting system to LIFO then it is done on a prospective basis and no prior period adjustments are done.
Inventory Adjustments

- IFRS states that inventories must be measured at lower of cost or net realisable value.
- Net Realisable Value = Inventory Sales Value – Estimated Cost of Completion and Disposal
- Holding inventory has significant financial risk as its value can deteriorate due to falling prices, obsolescence or due to any other reason.
- When inventory value falls below its carrying value then the inventory must be written down to its net realisable value and the loss must be recognized as an expense on the income statement.
- Frequently an inventory allowance account is used.
- Reversals are possible under IFRS incase the value of inventory increases.
- However US GAAP does not allow for reversals of write downs.
- US GAAP also specifies that inventory should be valued at lower of cost or market value of the inventory.
- Inventory write-downs negatively affect profitability ratios however activity ratios are improved as assets decrease.
- The companies that use LIFO are less likely to write down the inventory as compared to companies using FIFO or WAC.
Analytical Issues in Inventory disclosures and footnotes

• Disclosures regarding inventory classification can provide signals about a company’s future sales and profits.
• Increase in raw materials or WIP Inventory may indicate rising demand and consequently an increase in sales and profits. While a decrease will indicate falling demand.
• If growth in sales is lower than the growth in finished goods then it may indicate that future earnings could decline.
• Inventory write-down has a significant effect on the company’s financial ratios. This is important as this may violate some debt covenants.
• An analyst should always look at the reasons behind any significant changes in inventory. The analyst should also ensure that inventories are restated for LIFO to FIFO conversion before they can be compared.