Inflation Accounting

Advanced Financial Accounting
Inflation: Definitions

- Decrease in purchasing power of money due to an increase in the general price level
- “A process of steadily rising prices resulting in diminishing purchasing power of a given nominal sum of money”
  
  *The Penguin Dictionary of Economics*

- “Rise in prices brought about by the expansion of the supply of bank money, credit, etc.”
  
  *Oxford Advanced Learner’s Dictionary of Current English*
Accounting theory and valuation

- A central issue in accounting is the valuation of accounts appearing in the balance sheet and income statement.
- Measurement is an integral part of accounting theory.
  - Accounting is concerned with what information is needed by users, whereas measurement is involved with what is measured and how it is being measured.
- There are often trade-offs between verifiability and usefulness of the numbers generated.
Problem with additivity and economic relevance of accounting numbers – an example

- Assume that the assets of a company consist of two items
  - Land acquired in 1955 for 10,000
  - 10,000 cash

- Total assets for the company according to the conventional historic cost approach is thus 10,000 + 10,000 = 20,000

- There are several questions to think over, e.g.
  - What is the information content of number 20,000?
  - Can we with the 10,000 cash acquire a similar piece of land we already own?
Valuation approaches to accounting

- Historical cost accounting
  - e.g. FAS accounts (with some exceptions)
- Current value systems/Fair value accounting
  - IFRS
- General price-level adjustment/Inflation accounting
- Discounted cash flows
Inflation accounting

- A range of accounting methods designed to correct problems arising from historical cost accounting in the presence of *high inflation* and *hyperinflation*
- Also called *price level accounting*
- Similar to converting financial statements into other currency using an exchange rate
- IAS 29 requires implementation of inflation accounting for corporations in countries experiencing hyperinflation
Change in the price level is described by indexes

- **General indexes**
  - Price Index of Gross Domestic Product
  - Cost-of-living Index
  - Consumer Price Index
  - Wholesale Price Index
  - Production Price Index

- **Special indexes**
  - Industry indexes
  - Commodity group indexes
  - Commodity indexes
The Finnish Wholesale Price Index 1960-2011

Source: Statistical Yearbook of Finland 2011
Yearly Change (%) in the Finnish Wholesale Price Index

Source: Statistical Yearbook of Finland 2011
Inflation, consumer prices (annual %) in Europe 2015

Source: www.indexmundi.com/facts
Inflation, consumer prices (annual %)

Source:
www.indexmundi.com/facts
Index data

- Index data is produced by national statistical offices
  - In Finland Statistics Finland (Statistikcentralen/Tilastokeskus)
- International data sorted by theme can be found in several websites. A useful website is Index Mundi: http://www.indexmundi.com
- The website has, for example, an interesting comparison platform for Consumer Price indexes: http://www.indexmundi.com/facts/indicators/FP.CPI.TOTL/compare
Effective date: Annual periods beginning on or after January 2005

The financial statements in a currency of a hyperinflationary economy are stated in the end-of-period measuring unit current

Comparative figure for prior periods are restated into the same current measuring unit
IAS 29: Financial Reporting in Hyperinflationary Economies…

- The *gain or loss* on the monetary position is included *in profit and loss*

- An economy is *hyperinflationary* if the cumulative inflation rate over three years exceeds 100% (one of the necessary conditions)

- When an economy ceases to be hyper-inflationary, the balance at the end of the previous reporting period become the basis for the carrying amounts in subsequent financial statements
Some aspects on inflation accounting

Problems:
- Subjectivity
- Often complicated calculations

Benefits:
- Maintaining production capacity
- Shows the internal logic of accounting
Inflation accounting methods

- CPP – Current Purchasing Power
- CCA – Current Cost Accounting
- The Finnish AHI-method (Aktivoitujen Hankintamenojen Indeksointisovellus)
Current Purchasing Power (CPP)

- Retains historic cost accounting conventions
- In U.S. General Purchasing Power (GPP)
- Expresses accounts in terms of “purchasing units”
- The purchase power of money at the end of the accounting period as the base
- Maintains the general purchasing power of the invested capital
- The original purchasing costs are corrected by correction coefficients applying some general index, for example Retail Price Index or Consumer Price Index – CPI
Current Purchasing Power (CPP)...

- Monetary items – financial assets and liabilities – remain unchanged
- Inventories: FIFO purchase cost is corrected by a suitable correction coefficient to correspond the purchase power of the end of accounting period
- Fixed assets:
  - The purchase cost is corrected to correspond the purchase power of the end of the accounting period
  - The balance value of the fixed assets is the same percentage of the corrected purchase cost as the book value is of the original purchase cost
Current Purchasing Power (CPP)...

- *Equity* is defined as *Assets – Liabilities*
- Shareholders’ point of view
- Unsuitable for financing decisions
- Work intensive method
Nominal Statement of Income

\[
\begin{align*}
\text{TO} & \quad \text{TO} = \text{Turnover} \\
- \text{VC} & \quad \text{VC} = \text{Variable Costs} \\
= \text{GP} & \quad \text{GP} = \text{Gross Profit} \\
- \text{FC} & \quad \text{FC} = \text{Fixed Costs} \\
= \text{OP} & \quad \text{OP} = \text{Operating Profit} \\
- \text{IC} & \quad \text{IC} = \text{Interest Costs} \\
- \text{D} & \quad \text{D} = \text{Depreciation} \\
= \text{NP} & \quad \text{NP} = \text{Net Profit}
\end{align*}
\]

Below we also need:
\[
(\text{NG} = \text{Net Gain from Liabilities} \\
\text{TP} = \text{Total Profit})
\]
Nominal Balance Sheet

FixAss = Fixed Assets
Inv = Inventories
FA = Financial Assets
Assets = Total Assets
Eq = Owners’ Equity
Debt = Liabilities
CPP – Statement of Income

\[
\begin{align*}
\text{TO}^{\text{CPP}} - \text{VC}^{\text{CPP}} &= \text{GP}^{\text{CPP}} \\
- \text{FC}^{\text{CPP}} &= \text{OP}^{\text{CPP}} \\
- \text{IC}^{\text{CPP}} - \text{D}^{\text{CPP}} &= \text{NP}^{\text{CPP}} \\
\pm \text{NG} &= \text{TP}^{\text{CPP}}
\end{align*}
\]

\[
\begin{align*}
\text{TO}_{t}^{\text{CPP}} &= \text{TO}_{t} * \frac{\text{CPI}_{t,12}}{\text{CPI}_{t,6}} \\
\text{VC}_{t}^{\text{CPP}} &= \text{Inv}_{t-1,12}^{\text{CPP}} \\
&+ \sum_{k=1}^{K} \text{Purch}_{t,k} * \frac{\text{CPI}_{t,12}}{\text{CPI}_{t,k}} - \text{Inv}_{t,12}^{\text{CPP}} \\
\text{FC}_{t}^{\text{CPP}} &= \text{FC}_{t} * \frac{\text{CPI}_{t,12}}{\text{CPI}_{t,6}} \\
\text{IC}_{t}^{\text{CPP}} &= \text{IC}_{t} * \frac{\text{CPI}_{t,12}}{\text{CPI}_{t,6}}
\end{align*}
\]
CPP – Adjustments to the Statement of Income

\[
\begin{align*}
\text{TO}^\text{CPP} & - \text{VC}^\text{CPP} = \text{GP}^\text{CPP} \\
- \text{FC}^\text{CPP} & = \text{OP}^\text{CPP} \\
- \text{IC}^\text{CPP} - \text{D}^\text{CPP} & = \text{NP}^\text{CPP} \\
\text{NG} & = \text{TP}^\text{CPP}
\end{align*}
\]

\[
D_t^\text{CPP} = \sum_{i=1}^{N} \frac{D_{ti}}{\text{FixAss}_{ti}} \times \text{FixAss}_{ti}^\text{CPP}
\]

\[
\begin{align*}
\text{NG} & = \text{Liab}_{t-1,12} \times \frac{\text{CPI}_{t,12}}{\text{CPI}_{t-1,12}} - \text{Liab}_{t-1,12} \\
& + \Delta\text{Liab}_t \times \frac{\text{CPI}_{t,12}}{\text{CPI}_{t,6}} - \Delta\text{Liab}_t \\
& + \text{FA}_{t-1,12} - \text{FA}_{t-1,12} \times \frac{\text{CPI}_{t,12}}{\text{CPI}_{t-1,12}} \\
& + \Delta\text{FA}_t - \Delta\text{FA}_t \times \frac{\text{CPI}_{t,12}}{\text{CPI}_{t,6}}
\end{align*}
\]
CPP – Balance Sheet

\[
\text{FixAss}^{\text{CPP}}_t = \sum_{i=1}^{N} \text{FixAss}_{i,t} \times \frac{\text{CPI}_{t,12}}{\text{CPI}_p}
\]

\[
\text{Inv}^{\text{CPP}}_t = \sum_{k=1}^{K} \text{Purch}_k \times \frac{\text{CPI}_{t,12}}{\text{CPI}_k}
\]

\[
\text{FA}^{\text{CPP}}_t = \text{FA}_t
\]

\[
\text{Eq}^{\text{CPP}}_t = \text{Assets}^{\text{CPP}}_t - \text{Debt}^{\text{CPP}}_t
\]

\[
\text{Debt}^{\text{CPP}}_t = \text{Debt}_t
\]
Current Cost Accounting (CCA)

- Maintaining the production level of the company
- Main focus on *replacement of production capacity*
- Money is retained as the unit of measurement
- Different *special indexes* are applied to different items
- Work intensive
The Finnish AHI-method

- A combination of the CPP and CCA-methods
- Specially developed for firm analysis
- Calculations simple
- Little extra information needed
- Change in the general price level is described by the *Wholesale Price Index – WPI*
- Adjustments are made on a yearly basis
  - The price level at the middle of the accounting period as the base
AHI – Statement of Income

- Adjustments on
  - Variable Costs
  - Depreciation

- Other items remain unchanged

- Adjustment on variable costs is computed by multiplying the opening inventory value by the relative change in the index

- Adjustment on depreciation is the difference between AHI-depreciation and the depreciation in the nominal income statement
AHI – Statement of Income

\[ \text{TO}^{\text{AHI}}_t = \text{TO}_t \]

\[ \text{VC}^{\text{AHI}}_t = \text{VC}_t + \frac{\text{WPI}_t}{\text{WPI}_{t-1}} \times \text{Inv}_{t-1} - \text{Inv}_{t-1} \]

\[ \text{FC}^{\text{AHI}}_t = \text{FC}_t \]

\[ \text{IC}^{\text{AHI}}_t = \text{IC}_t \]

\[ \text{D}^{\text{AHI}}_t = \sum_{i=1}^{N} \text{D}^{\text{AHI}}_{i,t} \]

\[ \text{D}^{\text{AHI}}_{i,t} = \left( \frac{\text{WPI}_t \times \text{FixAss}_{i,p}}{\text{WPI}_p} \right) / \text{EconLife}_i \]

\( p = \text{purchase date,} \)

\( i = \text{asset i} \)
Adjustments to the Balance Sheet – Assets

- **Financial Assets** and **Inventories** (FIFO) remain unchanged
- **Fixed Assets** – first AHI-year
  - The original purchase cost is revaluated to the price level of the current year
  - Depreciation/year is computed according to the economic lifetime of the asset
  - The depreciations up to the current year are subtracted from the revaluated purchase cost
- **Fixed Assets** – after the first year
  - The AHI-balance value of the previous year is revaluated to the current year
  - New depreciation is computed based on the remaining economic lifetime
Adjustments to the Balance Sheet –
Equity and Liabilities

- **Equity**
  - The accounting result is replaced by the AHI-result

- **Liabilities**
  - Liabilities remain unchanged

- **Inflation Reserves**
  - Correspond to the adjustments made in the Statement of Income and the Balance Sheet
AHI – Balance Sheet

\[
\begin{align*}
\text{Assets}^{AHI} &= \text{FixAss}^{AHI} + \text{Inv}^{AHI} + \text{FA}^{AHI} \\
\text{Eq}^{AHI} &= \text{Eq}_{t-1}^{AHI} + \text{NP}_t^{AHI} \\
\text{Debt}^{AHI} &= \text{Debt}_t \\
\text{InflRes}^{AHI} &= \text{Inv}_t^{AHI} = \text{Inv}_t \\
\text{FA}_t^{AHI} &= \text{FA}_t
\end{align*}
\]
AHI – Balance Sheet – Inflation Reserves

\[
\text{InflRes}_{t}^{\text{AHI}} = \text{InvRes}_{t}^{\text{AHI}} + \text{FixAssRes}_{t}^{\text{AHI}}
\]

\[
\text{InvRes}_{t}^{\text{AHI}} = \text{InvRes}_{t-1}^{\text{AHI}} + (\text{VC}_{t}^{\text{AHI}} - \text{VC}_{t})
\]

\[
\text{FixAssRes}_{t}^{\text{AHI}} = \sum_{j=1}^{t} (D_{j}^{\text{AHI}} - D_{j}) + (\text{FixAss}_{t}^{\text{AHI}} - \text{FixAss}_{t})
\]
A Numerical Example

Correcting the annual reports for a company over years 1975-1976 using the AHI-method. A period of high inflation rate.

The Finnish Wholesale Price Index

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<th>Year</th>
<th>Index</th>
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</tr>
<tr>
<td>1976</td>
<td>626</td>
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The Finnish Wholesale Price Index and its Relative Change 1960-2011
References

- *IAS 29 amended for Annual Improvements to the IFRS standards 2007*