Åbo Akademi

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

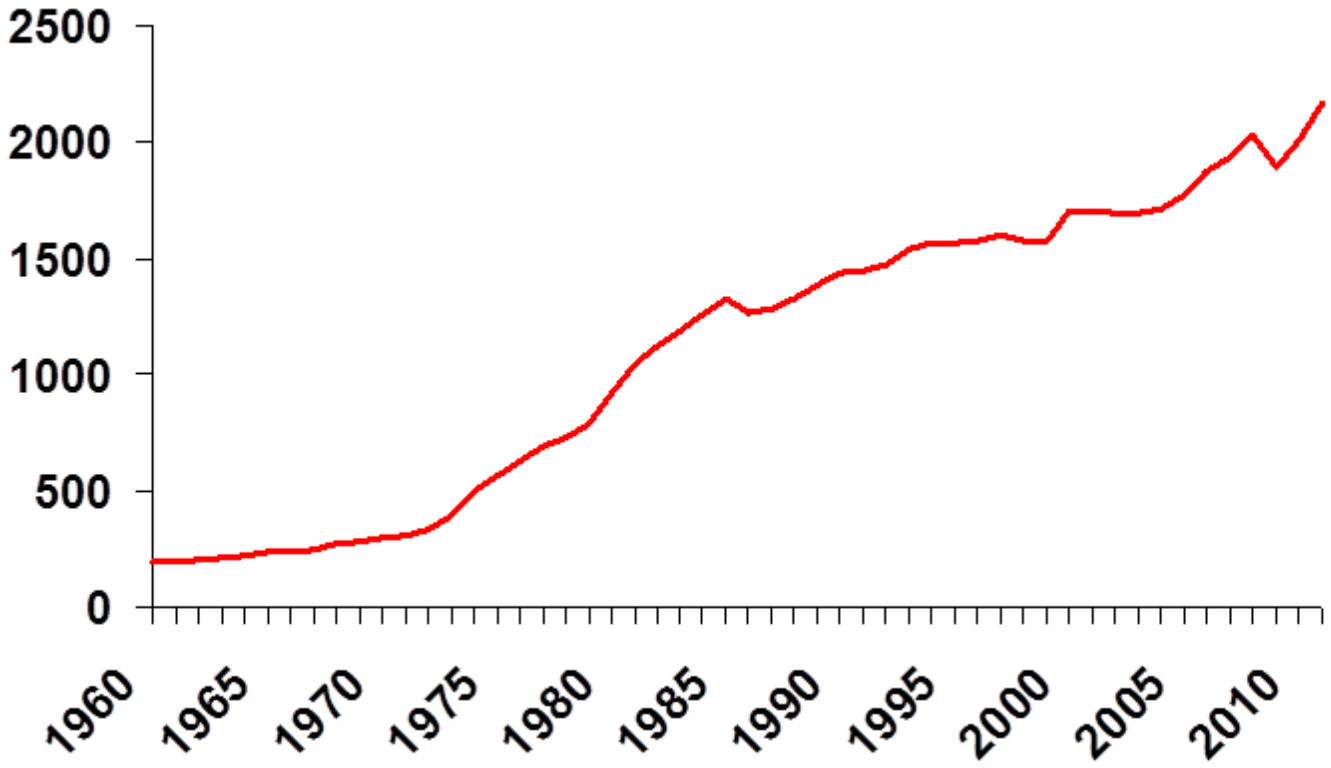
Inflation accounting

- 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

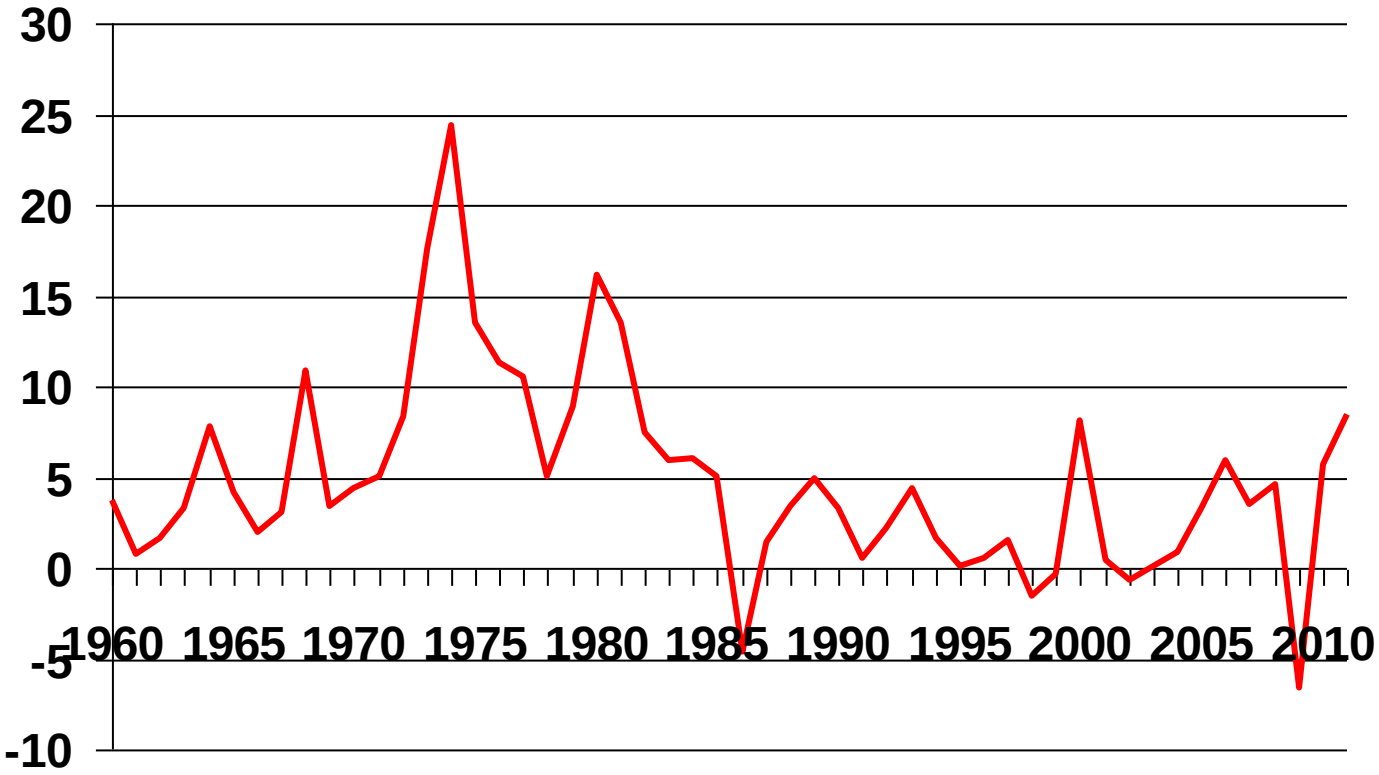
- General indexes
  - Price Index of Gross Domestic Product
  - Cost-of-living Index
  - Consumer Price Index
  - Wholesale Price Index
  - Production Price Index
- Special indexes
  - Industry indexes
  - Commodity group indexes
  - Commodity indexes

The Finnish Wholesale Price Index 1960-2011



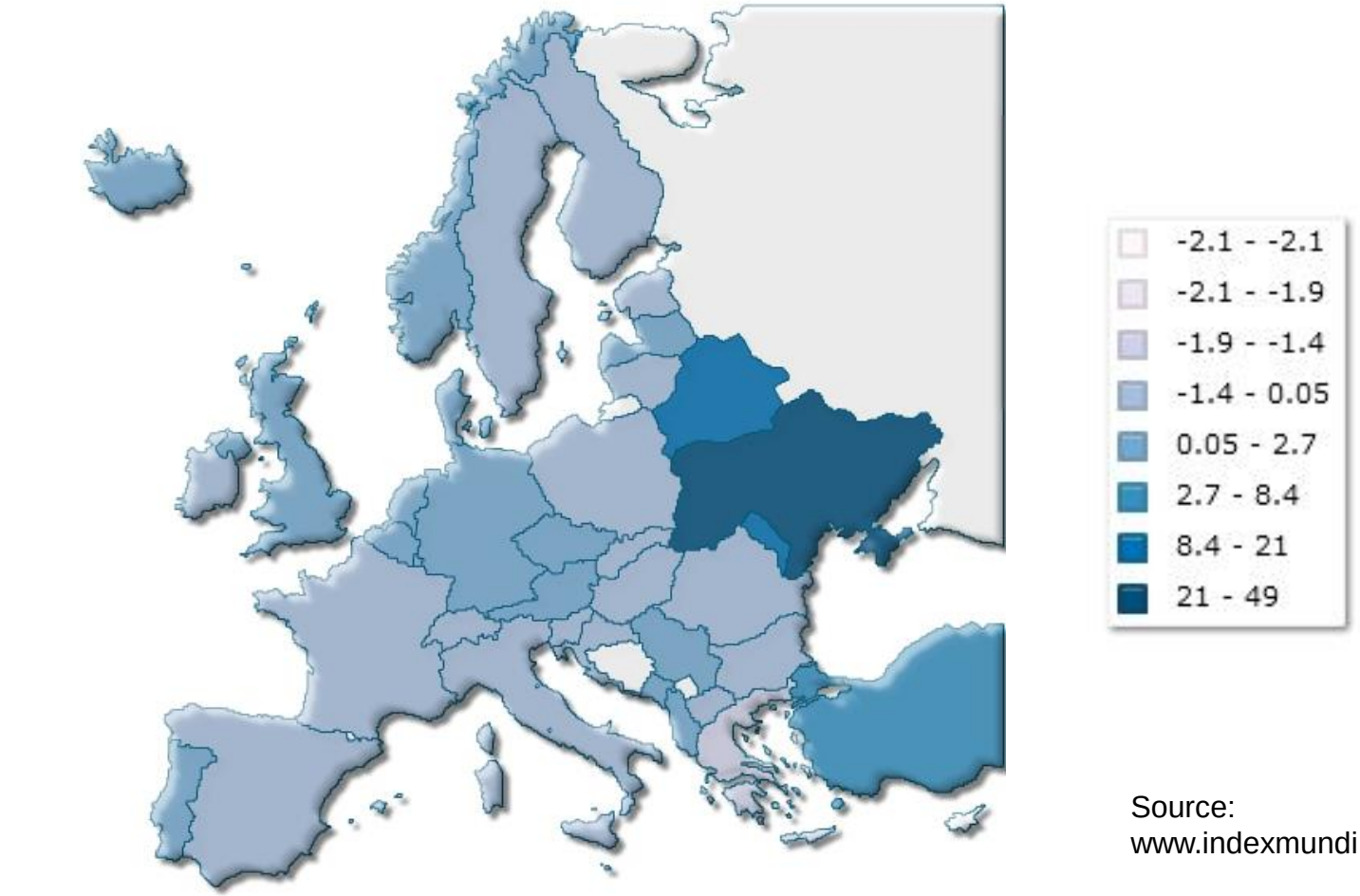
Source: Statistical Yearbook of Finland 2011

Yearly Change (%) in the Finnish Wholesale Price Index



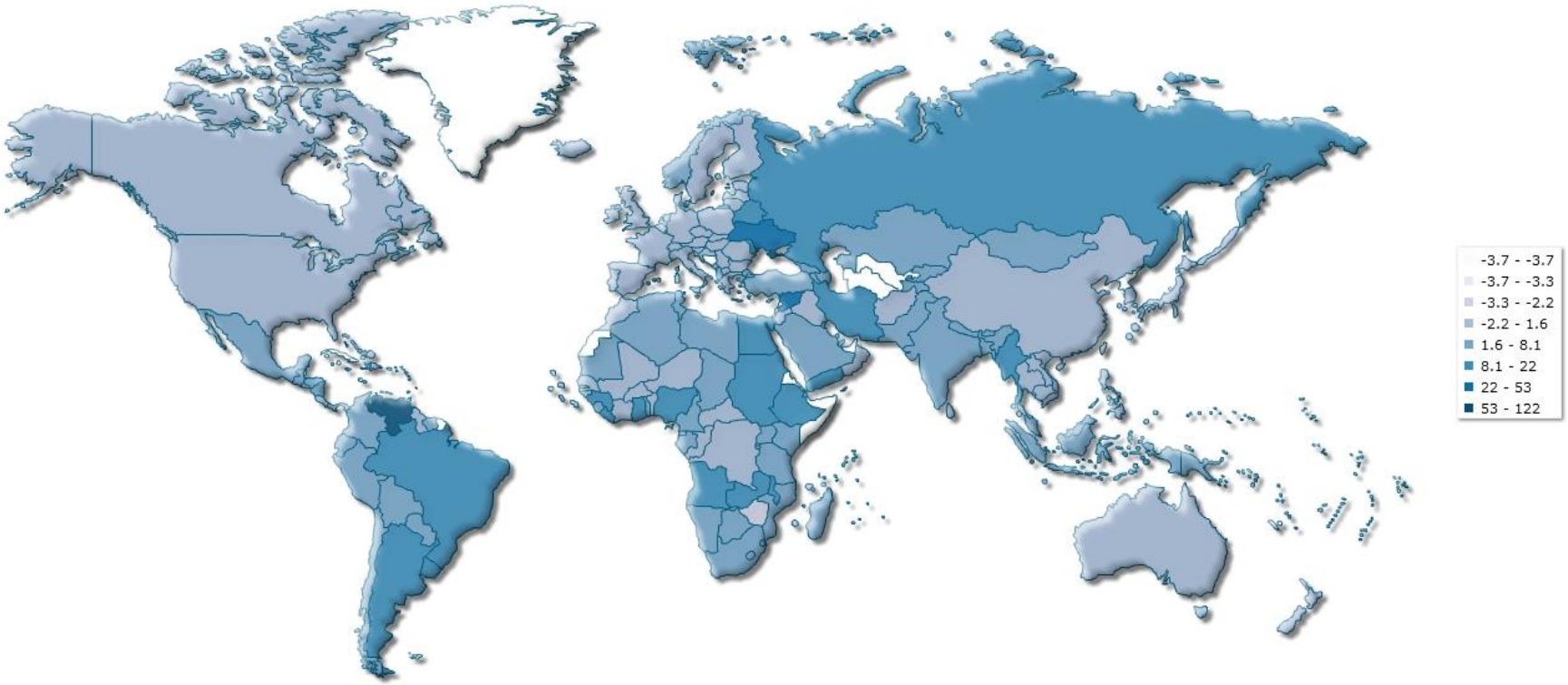
Source: Statistical Yearbook of Finland 2011

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

IAS 29: Financial Reporting in Hyperinflationary Economies

- 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

TO	TO = Turnover
- VC	VC = Variable Costs
= GP	GP = Gross Profit
- FC	FC = Fixed Costs
= OP	OP = Operating Profit
- IC	IC = Interest Costs
- D	D = Depreciation
= NP	NP = Net Profit

Below we also need:

(NG = Net Gain from Liabilities

TP = Total Profit)

Nominal Balance Sheet

FixAss	FixAss = Fixed Assets
Inv	Inv = Inventories
FA	FA = Financial Assets
Assets	Assets = Total Assets
Eq	Eq = Owners' Equity
Debt	Debt = Liabilities

CPP – Statement of Income

$$
\begin{aligned}
& TO^{CPP} \\
& -VC^{CPP} \\
\hline
&= GP^{CPP} \\
& -FC^{CPP} \\
\hline
&= OP^{CPP} \\
& -IC^{CPP} \\
& -D^{CPP} \\
\hline
&= NP^{CPP} \\
& +/- NG \\
\hline
&= TP^{CPP}
\end{aligned}
$$

$$TO_t^{CPP} = TO_t * \frac{CPI_{t,12}}{CPI_{t,6}}$$

$$VC_t^{CPP} = Inv_{t-1,12}^{CPP} + \sum_{k=1}^{K} Purch_{t,k} * \frac{CPI_{t,12}}{CPI_{t,k}} - Inv_{t,12}^{CPP}$$

$$FC_t^{CPP} = FC_t * \frac{CPI_{t,12}}{CPI_{t,6}}$$

$$IC_t^{CPP} = IC_t * \frac{CPI_{t,12}}{CPI_{t,6}}$$

CPP – Adjustments to the Statement of Income

$$TO^{CPP}$$
$$-VC^{CPP}$$
$$= GP^{CPP}$$
$$-FC^{CPP}$$
$$= OP^{CPP}$$
$$-IC^{CPP}$$
$$-D^{CPP}$$
$$= NP^{CPP}$$
$$+/- NG$$
$$= TP^{CPP}$$

$$D_t^{CPP} = \sum_{i=1}^{N} \frac{D_{t,i}}{FixAss_{t,i}} * FixAss_{t,i}^{CPP}$$

$$NG = Liab_{t-1,12} * \frac{CPI_{t,12}}{CPI_{t-1,12}} - Liab_{t-1,12}$$
$$+ \Delta Liab_t * \frac{CPI_{t,12}}{CPI_{t,6}} - \Delta Liab_t$$
$$+ FA_{t-1,12} - FA_{t-1,12} * \frac{CPI_{t,12}}{CPI_{t-1,12}}$$
$$+ \Delta FA_t - \Delta FA_t * \frac{CPI_{t,12}}{CPI_{t,6}}$$

CPP – Balance Sheet

$$FixAss_t^{CPP} = \sum_{i=1}^{N} FixAss_{i,t} * \frac{CPI_{t,12}}{CPI_p}$$

$$Inv_t^{CPP} = \sum_{k=1}^{K} Purch_k * \frac{CPI_{t,12}}{CPI_k}$$

$$FA_t^{CPP} = FA_t$$

$$FixAss^{CPP}$$
$$Inv^{CPP}$$
$$FA^{CPP}$$
$$\overline{Assets^{CPP}}$$

$$Eq_t^{CPP} = Assets_t^{CPP} - Debt_t^{CPP}$$

$$Debt_t^{CPP} = Debt_t$$

$$Eq^{CPP}$$
$$\underline{Debt^{CPP}}$$

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

$$TO^{AHI}$$
$$-\ VC^{AHI}$$
$$= GP^{AHI}$$
$$-\ FC^{AHI}$$
$$= OP^{AHI}$$
$$-\ IC^{AHI}$$
$$-\ D^{AHI}$$
$$= NP^{AHI}$$

$$TO_t^{AHI} = TO_t$$

$$VC_t^{AHI} = VC_t + \frac{WPI_t}{WPI_{t-1}} * Inv_{t-1} - Inv_{t-1}$$

$$FC_t^{AHI} = FC_t$$

$$IC_t^{AHI} = IC_t$$

$$D_t^{AHI} = \sum_{i=1}^{N} D_{i,t}^{AHI}$$

$$D_{i,t}^{AHI} = \left(\frac{WPI_t}{WPI_p} * FixAss_{i,p} \right) \Big/ EconLife_i$$

$p = \text{purchase date},$

$i = \text{asset } i$

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

$$FixAss^{AHI}$$

$$FixAss_t^{AHI} = \sum_{i=1}^{N} FixAss_{i,p} * \frac{WPI_t}{WPI_p} - (t - p + 1) * D_{i,t}^{AHI}$$

$$Inv^{AHI}$$

$$Inv_t^{AHI} = Inv_t$$

$$FA^{AHI}$$

$$FA_t^{AHI} = FA_t$$

$$Assets^{AHI}$$

$$Eq^{AHI}$$

$$Eq_t^{AHI} = Eq_{t-1}^{AHI} + NP_t^{AHI}$$

$$Debt^{AHI}$$

$$Debt_t^{AHI} = Debt_t$$

$$InflRes^{AHI}$$

AHI – Balance Sheet – Inflation Reserves

FA^{AHI}

Inv^{AHI}

$FixAss^{AHI}$

$Assets^{AHI}$

$Debt^{AHI}$

Eq^{AHI}

$InflRes^{AHI}$

$$InflRes_t^{AHI} = InvRes_t^{AHI} + FixAssRes_t^{AHI}$$

$$InvRes_t^{AHI} = InvRes_{t-1}^{AHI} + (VC_t^{AHI} - VC_t)$$

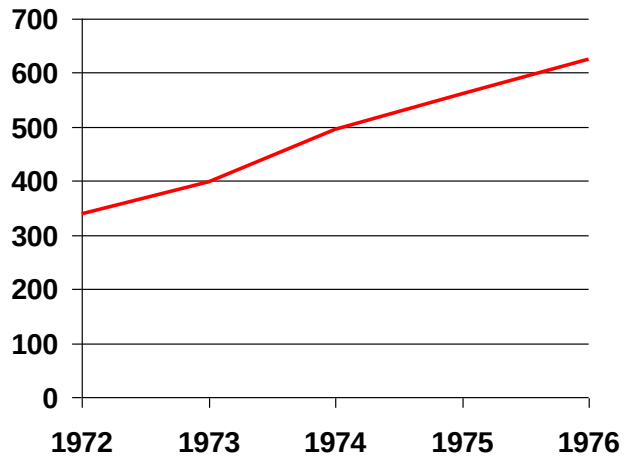
$$FixAssRes_t^{AHI} = \sum_{j=1}^{t}(D_j^{AHI} - D_j) + (FixAss_t^{AHI} - FixAss_t)$$

A Numerical Example

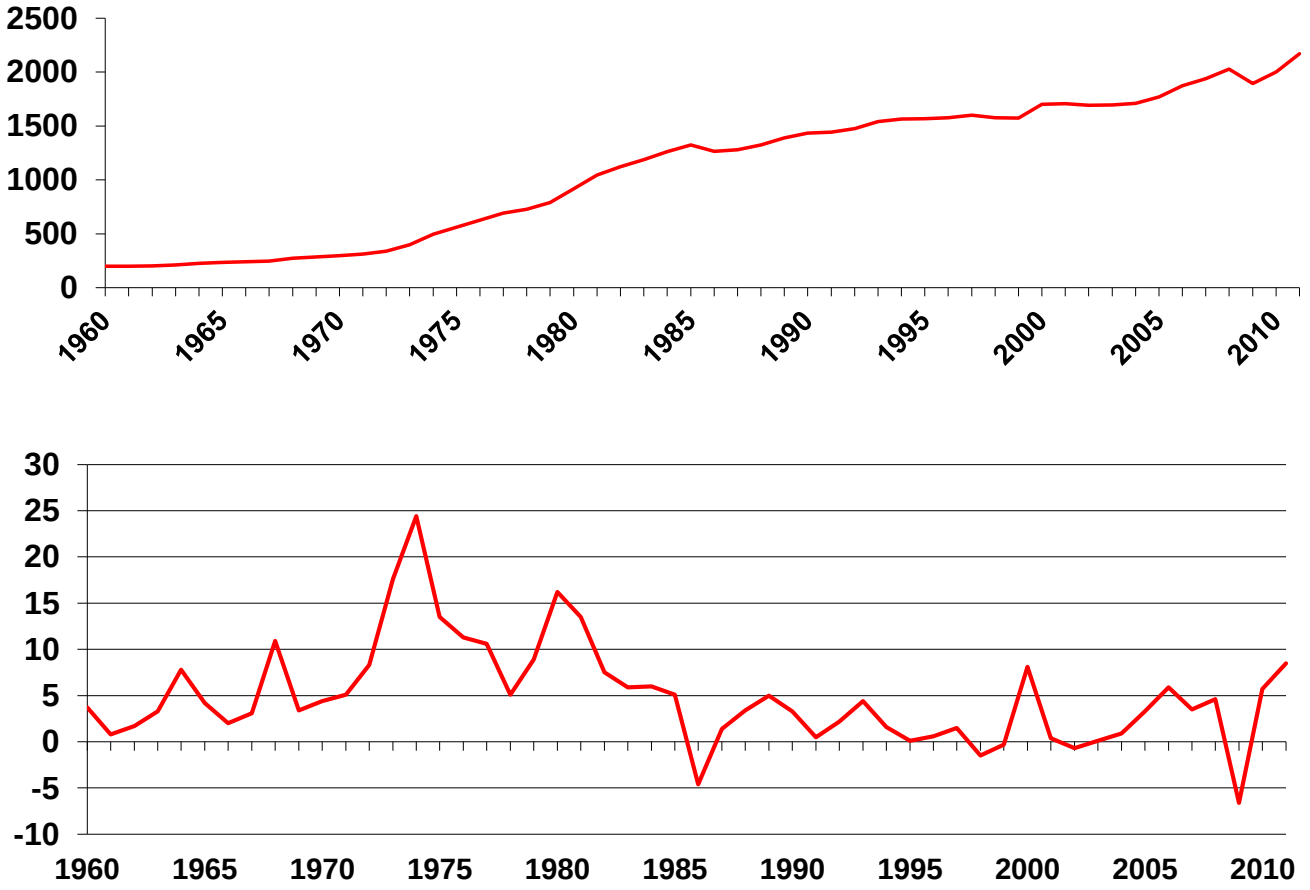
Correcting the annual reports for a company over years 1975-1976 using the AHI-method. A period of high inflation rate.

The Finnish Wholesale Price Index

1972	338
1973	398
1974	495
1975	562
1976	626



The Finnish Wholesale Price Index and its Relative Change 1960-2011



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- Yritystutkimusneuvottelukunta: *Inflaation huomioon ottaminen yritystutkimuksessa,* Oy Gaudeamus Ab, Helsinki 1977.
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