Core inflation measurement in Norway

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Monetary policy – operational target

• In 2001, the Central Bank got a monetary policy regulation
  – Annual consumer price inflation of approx. 2.5 per cent over time

• In general, the direct effects on consumer prices resulting from changes in
  – interest rates
  – taxes
  – excise duties and
  – extraordinary, temporary disturbances shall not be taken into account
Extraordinary temporary disturbances?

• Back in 2001 extraordinary temporary disturbances were defined as
  – Price movements of energy products - highest st. dev.
     Electricity
     Liquid fuels
     Heat energy
     Fuels and lubricants
  – Other components up for discussion;
     Fruits and vegetables
     Clothing and footwear

• New methodology in recent years - high volatility
  – Passenger transport by air
  – Books
Energy products in CPI

- Energy products constitute under 7 per cent of total consumption

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity, gas and other fuels</td>
<td>3.52 %</td>
</tr>
<tr>
<td>Fuels, lubricants, personal transport equipment</td>
<td>2.90 %</td>
</tr>
<tr>
<td><strong>Total weights of energy products</strong></td>
<td><strong>6.42 %</strong></td>
</tr>
</tbody>
</table>
Energy products in CPI

- Energy products not so dominant, but strong fluctuations in short term

12-months change

- Electricity
- Petrol
Energy products in CPI

- Energy products not so dominant, but higher price trend on long term

Index (1998=100)
A set of official indicators

• CPI-ATE
  – CPI adjusted for tax changes and excluding energy products

• CPI-ATE seasonally adjusted
  – Using X12 ARIMA tool

• CPI-AT
  – CPI adjusted for tax changes

• CPI-AE
  – CPI excluding energy products

• CPI-AEL
  – CPI excluding electricity
Taxes and Duties

- Tax adjustments in the CPI-AT/CPI-ATE

<table>
<thead>
<tr>
<th>Tax Category</th>
<th>Commodity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value added tax</td>
<td>Tax on mineral products</td>
</tr>
<tr>
<td>Tax on spirit, wine and beer</td>
<td>Tax on chocolate and sweets</td>
</tr>
<tr>
<td>Tax on tobacco</td>
<td>Tax on non-alcoholic beverages</td>
</tr>
<tr>
<td>Tax on sugar</td>
<td>Tax on petrol</td>
</tr>
<tr>
<td>Tax on air travel</td>
<td>Tax on diesel fuel</td>
</tr>
<tr>
<td>Tax on disposable beverage packing</td>
<td>Tax on electricity</td>
</tr>
<tr>
<td>Tax on motor vehicles</td>
<td></td>
</tr>
</tbody>
</table>
CPI adjusted for tax changes and excluding energy products
HICP- Constant Taxes

• **HICP-CT** and **CPI-AT** - similar methodology

\[ CPI - AT_{t_0,t_n} = \sum_{i=1}^{g} \left( p_{i,t_n} - (\tau_{i,t_n}) + \left( \tau_{i,t_0} \cdot \frac{I_{i,t_n}}{I_{i,t_0}} \right) \right) \]

• Adjustment of **nominal** tax changes in the HICP-CT

• Adjustment of **real** tax changes in the CPI-AT
  – Adjusting taxes per physical unit with the inflation
  – Drawback: index varies even though there are no actual tax changes

• Taxes treated consistently?
  – Different treatment of ad valorem taxes and taxes per physical unit
Comparisons CPI-AT and HICP-CT

- What is the impact of the general inflation?

- Statistics Norway started calculating and transmitting to Eurostat HICP-CT in 2014

- How to present for users different measurements of what appears to be quite similar methodology?
Other core inflation indicators in Statistics Norway

• 10 per cent trimmed mean
  – Ranking the CPI-AT components and their weights by the size of their price movement and the top and bottom distribution are removed

• 20 per cent trimmed mean

• Weighted median
  – The inflation rate for the item which is in the middle of the total distribution of price changes
  – Can vary from month to month
  – How to interpret?

• Extreme price movements are systematically removed

• Available for users (mostly financial analysts)
  – Not available on the Internet
Comparison with other measurements of core inflation

12-months change

Trimmed mean 10
CPI-ATE
CPI

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