TURKISH STATISTICAL INSTITUTE

COMPUTATION METHODOLOGIES
INDUSTRIAL TURNOVER INDEX

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Indexing

- Monthly Industrial Turnover Index was firstly published in 2008 with NACE Rev. 1.1 and base year 2005=100
- In September 2010 classification changed to NACE Rev.2 with back casting
- In March 2013 base year was altered to 2010=100

Indexing

- ITI is a 2010=100 fixed base year Laspeyres Index
- The turnover index is a simple value index

  (price multiplied by quantity/volume),

  and is a direct index in that it compares the current period with the fixed period in the base year.
- The same compilation is used for the sub-indicators for the domestic and non-domestic markets.

Indexing

- In order to compile ITI at higher levels of NACE, the indices at the lowest level have to be aggregated.
- This aggregation is done by using weights based on the turnover share of each activity in the base year. For the sub-indicators the weights are based on the turnover shares of each activity in the two separate markets, domestic and non-domestic.

Indexing

- SBS variable turnover for industry are used to calculate weights.
- Domestic and non-domestic weights are calculated from STS data because SBS does not have this information.

Indexing

- The calculation of value indices I for a given activity (k) are based on the turnover (T) of all observation units (h) of the reference month (t) compared with the monthly average of turnover of the base period (0):

$$I_k(t) = \frac{\sum_{h \in k} T_h(t)}{\sum_{h \in k} T_h(0)} \times 100$$

Indexing

- The turnover can be broken down by different activities and by different markets. Considering the distribution by (k) activities and (x) markets, each elementary index is determined in two dimensions (turnover T of activity k for market x) and the weights (w) assume the following composition;

$$w_k^x(0) = \frac{T_k^x(0)}{\sum_{k=1}^{K}\sum_{x=1}^{X} T_k^x(0)}$$

$$w_k(0) = \sum_{x=1}^{X} w_k^x(0)$$

$$w_x(0) = \sum_{k=1}^{K} w_k^x(0)$$

$$\sum_{k=1}^{K}\sum_{x=1}^{X} w_k^x(0) = 1$$

Indexing

- The turnover index is a value index (development in volume and prices of transactions). Thus, the index corresponds to the development of the turnover (value) of the activity (k) market (x) in the reference period (t) in comparison with the base period (0):

$$I_k^x(t) = \frac{T_k^x(t)}{T_k^x(0)}$$

- The elementary index for total turnover in an activity (k) is defined as;

$$I_k(t) = \sum_{x=1}^{X} w_k^x(0) \cdot I_k^x(t)$$

- For an elementary aggregate limited to market (x) is;

$$I_x(t) = \sum_{k=1}^{K} w_k^x(0) \cdot I_k^x(t)$$

Indexing

- The index for total turnover can be obtained from elementary indexes of activities or of markets;

$$I(t) = \sum_{k=1}^{K} \sum_{x=1}^{X} w_k^x(0) \cdot I_k^x(t)$$

- or from the elementary aggregation of activities

$$I(t) = \sum_{k=1}^{K} w_k(0) \cdot I_k(t)$$

or of markets;

$$I(t) = \sum_{x=1}^{X} w_x(0) \cdot I_x(t)$$

- Lastly, total turnover for reference period (t) corresponds to the index of turnover between (t) and (0). From the above it can be concluded that;

$$I(t) = \frac{\sum_{k=1}^{K} \sum_{x=1}^{X} T_k^x(t)}{\sum_{k=1}^{K} \sum_{x=1}^{X} T_k^x(0)}$$

Reliability of estimates

- Deflated turnover indices are compared with Industrial Production Indices (IPI). Annual and monthly rate of changes of IPI and ITI are cross checked. This comparison are done at two digit and upper levels. Domestic PPI and Non-Domestic PPI indices are used to deflate Domestic and Non-Domestic Turnover indices.
- In theory, if there is no stock changes in an economy, deflated turnover index converges to IPI.

Reliability of estimates

- Micro data and indices are examined by ISG staff. Very high changes (max&min) in companies total, domestic and non-domestic turnover data are asked to regional offices staff.
- Box method is used for micro data level and outliers are determined for total, domestic and non-domestic turnover data. This outliers are asked to regional offices staff and they validate data from enterprises..

Reliability of estimates

- Another outlier detection method is used with TERROR TSW program. In TSW program TERROR (Tramo for ERRORS) menu is used to detect outlier (for given k_1 and k_2 parameter) for last observation at four digit level to total industry.
- Response rate is approximately 99%.

Revisions

- There are two types of revisions; major and routine
- Reasons for **Major revisions**:
  - Base year changes,
  - classification, definition and scope changes,
  - method, application and question structure changes,
  - changes in the source data,
  - updates resulting from legal regulations.

Revisions

- Reasons for **Routine revisions**:
  - Benchmarking: Results of short term statistics can be revised by the results of annual statistics.
  - Change in declaration of respondents: Respondents may give a wrong answer the questionnaire. After publishing statistics respondents may correct the declaration causes a revision.
  - Change in imputed values: Missing observations are imputed, but imputed values can not be reflect actual values. After publishing statistics, real values can be compiled and this produce a revision.

Revisions

- Reasons for **Routine revisions**:
  - Change on seasonal and calendar adjusted data: Seasonal and calendar adjustment procedure is subject to revisions over time, the re-estimation of seasonal and calendar component as new observations are added. Seasonal and calendar adjustments models are determined at the beginning of the each year.

Revisions

- **Routine revision Policy for ITI**:
- **For unadjusted series;**
  - In current month, index values are revised for previous month
  - In the end of year, index values are revised for each month.
  - Revision ratio for unadjusted series is approximately less than 1%.
- **For adjusted series;**
  - Model based adjusted series are revised every month of the last three years.

THANK YOU