

Index of Industrial Production in Turkey

Workshop on Industrial Statistics for countries in the ESCWA
region
11-13 December 2017, Beirut, Lebanon
AHMET PALAS

Contents

- ↗ Information on TURKSTAT
- ↗ European Union STS
- ↗ Introduction IPI
- ↗ IPI implementation for Turkey
- ↗ Other issues
 - ↗ Seasonal Adjustment
 - ↗ Chain Index
 - ↗ Production value approach
 - ↗ Deflation
 - ↗ Benchmarking

TURKSTAT

Statistical Act ;

The current legal basis of Turkish Statistical Institute (TURKSTAT) is Law No 5429 of 10th November 2005. In this law the definition and role of Official Statistics are laid down. The contents of these statistics are described in general terms.

The law furthermore stipulates the use of administrative data for compiling statistics as well as the obligation for respondents to supply the information they are asked for, including the possible penalties they fail to do so.

TURKSTAT

TURKSTAT has the independence to determine the methodology and release dates of statistics for which it is responsible.

Data are collected only for statistical purposes and confidentiality is assured.

The confidentiality of individual responses is guaranteed.

The TURKSTAT logo is used on all statistics published under the law.

Right to collect data in general

- ⇒ TURKSTAT has the exclusive right to collect data.

General obligation of enterprises to reply

- ⇒ Surveys are mandatory and non-respondents are fined in most cases.

Obligation to safeguard confidential data

- ↳ TURKSTAT is obliged to safeguard confidential data. Data obtained by TURKSTAT may only be used for statistical purposes.
- ↳ Data may not be disseminated where individual data may be identified. The Law on statistics specifies the rules for protecting individual data from being revealed.

Treatment of confidential data

Confidential data can be accessed only by those involved in the production of official statistics, to the extent that they need for performing their duties properly.

If the number of the statistical unit in any cell of the data table formed by aggregating the individual data is less than three or one or two of the statistical units are dominant even if the number of units is three or more, the data in the concerned cell is considered confidential.

Short Term Business Statistics

- ↪ Industrial Statistics Group
- ↪ Construction and Services Statistics Group
- ↪ Producer Prices Group

European Union Short Term Business Statistics

Short-term business statistics are in great demand for economic analysis by a large number of users - in the Commission services, the European Central Bank, national governments as well as private sector companies and financial markets.

Short-term business statistics are regulated by Council Regulation 1165/98 which was in force in 1998 and amended regulation (1158/2005) in July 2005

European Union Short Term Business Statistics

Since February 1997 the organisation of the European statistical system has the Council Regulation on Community statistics as its legal basis and this is known as the statistical law.

This legal basis concerns the production of Community statistics and lays down the roles to be played by national and Community authorities in the production of these statistics.

The statistical law is structured into four main parts:

1. The procedures for the drawing-up and implementation of Community statistical programmes
2. The definition of the principles of impartiality, reliability, relevance, cost-effectiveness, statistical confidentiality
3. The dissemination of Community statistics
4. The definition of statistical confidentiality

EU - STS

Statistical units :

Statistical units play a prominent role in the EU system of business statistics. The SU-Regulation lists and defines eight types of statistical units .

These statistical units are:

- ↪ enterprise
- ↪ institutional unit
- ↪ enterprise group
- ↪ kind-of-activity unit (KAU)
- ↪ unit of homogeneous production (UHP)
- ↪ local unit
- ↪ local kind-of-activity unit (LKAU)
- ↪ local unit homogeneous production (LUHP)

EU - STS

Classification:

Classification systems provide a common language both for the compilation and for presentation of statistics.

	Activities		Products			
Worldwide	ISIC	→	CPC	→	← HS →	STIC
	↓		↓		↓	
EU	NACE	→	CPA	→	← CN →	PRODCOM
	↓		↓			↓
National	National versions of NACE	→	National versions of CPA		→	National versions of PRODCOM

Production of Statistics:

Community statistics are being produced on the basis of uniform standards and harmonised methods.

In terms of data collection, this has two important consequences.

The first is that it is the Member States who are responsible for the production of the national data - this has always been the situation in STS.

Production of Statistics:

Secondly uniform, Community standards such as definitions and classification are being used by all Member States where they exist.

While producing statistics ;

- ↪ Compulsory or voluntary, regular or ad hoc census or sample postal, electronic or interview or
- ↪ Company register VAT declarations, social security declarations, tax declarations, permits membership records or
- ↪ Mixed approach, Statistical business register Estimations (synthesis) could be used

EU Member Countries Implementation					
	Price Adjusment			Quantity	Hours Worked
	Turnover	Production Value	Total		
Belgium	0	80	80	0	20
Latvia	100	0	100	0	0
Lithuanian	100	0	100	0	0
Hungary	100	0	100	0	0
Poland	100	0	100	0	0
Bulgaria	100	0	100	0	0
Germany	5	78	83	8	9
Denmark	82	0	82	17	1
Estonia	83	0	83	17	0
Swedish	75	0	75	20	5
Netherlands	65	0	65	27	8
Britain	73	0	73	27	0
Ireland	54	0	54	46	0
Austria	0	38	38	62	0
France	28	0	28	66	6
Luxembourg	0	15	15	75	10
Spain	0	21	21	78	1
Slovakia	0	20	20	80	0
Finland	1	12	13	82	4
Norway	0	0	0	85	15
Italy	0	0	0	94	6
Slovenia	0	0	0	100	0
Romania	0	0	0	100	0
Czech	0	0	0	100	0

				DEFLATED PRODUCTIO N VALUE	DEFLATED TURNOVER	HOURS WORKED	OTHER	LEVEL OF DEFLATION
COUNTRIES	TYPE OF INDEX	CHAIN	QUANTITY					
BELGIUM	Laspeyres	Yes						
ESTONIA	Paasche	Yes						
LATVIA	Laspeyres	Yes						
LITHUANIAN	Paasche	Yes						4 digit (NACE Rev2.)
HUNGARY	Paasche	Yes						
NETHERLANDS	Laspeyres	Yes	27%		57%	9%	7%	Majority 3 or 4 digit (NACE Rev2.)
SLOVENIA	Laspeyres	Yes						
FINLAND	Laspeyres	Yes	40%		60%			4 digit (PPI)
SWEDEN	Laspeyres	Yes	4%		92%	4%		
SERBIA	Laspeyres	Yes						
CROATIA								
	Laspeyres	Yes						
ENGLAND								
	Laspeyres	Yes	30%		70%			
BULGARIA								
	Laspeyres	No						3 digit(NACE Rev2.)
CZECH								
	Laspeyres	No						
DENMARK	Laspeyres	No						
GERMANY	Laspeyres	No	10,5%	88,6%	0,5%	0,4%		Lowest proper production value level
IRELAND	Laspeyres	No						
GREECE								
	Laspeyres	No						
SPAIN								
	Laspeyres	No	78%		21%	1%		
FRANCE	Laspeyres	No	52,9%	39,8%		7,4%		
ITALY	Laspeyres	No	65.50%		7.90%	12.60%	14%	
CYPRUS	Laspeyres	No						3 digit(PPI)
LUXEMBOURG	Laspeyres	No	75%	20%		5%		
MALTA	Laspeyres	No						
AUSTRIA	Laspeyres	No						
POLAND	Laspeyres	No						2 digit(NACE Rev2.)
PORTUGAL	Laspeyres	No	80%		7%	13%		
SLOVAKIA	Laspeyres	No						
MACEDONIA								

EU - STS

Weights

Each index requires its own specific weights based on a relevant indicator.

Index	Used weight
Production	Value added
Turnover	Turnover
Domestic turnover	Domestic turnover
Non - domestic turnover	Non - domestic turnover
New orders	Turnover
Domestic new orders	Domestic turnover
Non - domestic new orders	Non - domestic turnover
Number of person employed	Number of person employed
Hours worked	Hours worked
Wages and salaries	Wages and salaries
Output price	Turnover
Domestic output price	Domestic turnover
Non-domestic output price	Non - domestic turnover
Permits	Turnover

Production

Production determines the use of resources and labors.

The production index is regarded as one of the most important measures of economic activity.

Production index shows the trend in the volume of output and gives an indication of the trend in value added.

Production

Developments in the industrial production index describe the economic cycles of industry, and this can be used to assess the development of GDP as a whole.

For STS this index is the reference indicator for economic development and it is used in particular to identify turning points in economic development at an early stage.

Production

The production index is also known as an output index or a production volume index. In fact, the theoretical purpose of the index is not to reflect production but value added.

In practice, however the index is not referred to as a value added index, any national statistical authorities produce an index using value added, and they rely instead mainly on production or turnover data.

How to measure of production

The most accurate production information on products is obtained from specialized surveys on output. In the EU Member States the Prodcom survey is carried out annually.

The Prodcom list describes between 5,000 and 6,000 products and/or product categories assigned to NACE Rev.2 Sections B,C,D and E.

To calculate an IPI, however, sub-annual and preferably monthly production information is required.

How to measure of production

For this reason, the best theoretical basis for an IPI is a representative monthly production survey.

Production statistics ascertain the quantity and/or value of goods and their related industrial services.

The appropriate variable for an IPI is total production, since the entire economic activity of the unit is to be measured. **Total production is the sum of production intended for sale and production for further processing within the same unit.**

CHANGE OF VALUE ADDED WITH CONSTANT PRICES, MAIN FORMULATION

$$\frac{OP_0 * OQ_t - IP_0 * IQ_t}{OP_0 * OQ_0 - IP_0 * IQ_0}$$

**Output minus
Input, period t
(With the based
year prices)**

**Output minus
Input, period 0
(With the based
year prices)**

**=Change of Value
Added with
Constant Prices**

OP: Output Price
IQ: Input Quantity

OQ: Output Quantity
0: Based Period

IP: Input Price
t: Drawing up a Report Period

CHANGES OF OUTPUT VALUE

$$\frac{OP_0 * OQ_t - IP_0 * IQ_t}{OP_0 * OQ_0 - IP_0 * IQ_0}$$

**Change of Output
with Constant
Prices (deflated
endorsement)**

Assumptions:

Constant Input/Output-
ratio and Endorsement /
Output-ratio

When :

Heterogeneous Products;
Quality Changes

Sector:

Electronic, Metal
Products, Textile etc.

OP: Output Price

OQ: Output Quantity

IP: Input Price

IQ: Input Quantity

0: Based Period

t: Drawing up a Report Period

CHANGES OF OUTPUT QUANTITY

$$\frac{OP_0 * OQ_t - IP_0 * IQ_t}{OP_0 * OQ_0 - IP_0 * IQ_0}$$

**Change of
Output
Quantity**

Assumption:

Constant Value Added
Profit Per Product Unit

When : Homogeneous
Products ; Constant
Quality

Sector:

Petroleum Products ;
Main Metal Industry
etc.

OP: Output Price

OQ: Output Quantity

IP: Input Price

IQ: Input Quantity

0: Based Period

t: Drawing up a Report Period

CHANGES OF INPUT QUANTITY

$$\frac{OP_0 * OQ_t - IP_0 * IQ_t}{OP_0 * OQ_0 - IP_0 * IQ_0}$$

**Change of
Input Quantity**

Assumption : Constant Value Added Profit Per Unit ; Unsubstitution

When: Long-term Production Processes, Basic Processes (Such as Brad)

Choices:

Energy Input, Worker's Pay Input , Raw Material etc.

OP: Output Price

OQ: Output Quantity

IP: Input Price

IQ: Input Quantity

0: Based Period

t: Drawing up a Report Period

INDEX SELECTION

Quantity Index: For homogeneous products which quantity datum/data? can be obtained.

Deflated Production value Index: For heterogeneous products which quantity datum is not meaningful / for the products which changes of quality is significant (medicine etc.)

Endorsement Index : for sectors which product detail information cannot be compiled. (Recycle)

Input Index (worked hours): Production which production period is long term.(ship building etc.)

Introduction

Industrial production Index is produced by Industry group of Short Term Business Statistics Department in TurkSTAT.

This group also produces Industrial Turnover Index, Industrial Labor Input Indices and Labor Cost Indices.

Purpose

Industrial production index is a monthly index which is a pioneer indicator for GDP.

Main aim of industrial production index is to reflect the production changes in industry sector in short periods.

HISTORY OF INDUSTRIAL PRODUCTION INDEX IN TURKEY

Year	Title	Coverage	Period	Classification
-1977	Quarterly Manufacturing Production and Employment	Approximately 70 products	Quarterly	--
1977-1981	Quarterly Manufacturing Production and Employment	373 Products	Quarterly	--
1981=100	Quarterly Manufacturing Production Index	278 Products	Quarterly	ISIC Rev. 2
1986=100	Manufacturing Employment, Payment Tendency Production	544 Products	Quarterly	ISIC Rev. 2
1986=100	Monthly Industrial Production Index	586 Products	Monthly	ISIC Rev. 2
1992=100	Monthly and Quarterly Industrial Production Indices	855 Products	Monthly-Quarterly	ISIC Rev. 2
1997=100	Monthly Industrial Production Index	1 635 Products	Monthly-Quarterly	ISIC Rev. 3
2005=100	Monthly Industrial Production Index	1 442 Products (Prodtr 2006)	Monthly	NACE Rev.1.1

Data collection and current frame

Data for compilation of industrial production index is collected by regional offices from enterprises with monthly industrial production questionnaire.

Web based application is used for data collection. Paper based application has been removed since 2013. In 2014, 8012 enterprises are covered in questionnaire.

SHORT TERM BUSINESS STATISTICS MONTHLY INDUSTRIAL PRODUCTION QUESTIONNAIRE

D201

Registration
Number

Year 2013 Month

Economical
Activity Code

ATTENTION :

Before answering this questionnaire please pay attention to the detailed explanatory notes of the survey.

- 1- This survey is being conducted in accordance with decree commanded as Law 5429, dated 18.11.2005 those who do not give the requested information correctly and in time, and those who disclose or give the collected personal data to public or private institutions are subjected to penalty according to the provisions of Law 53 and Law 54 which are indicated by this decree mentioned above. In case of not filling the questionnaire within the requested time or answering incomplete and inaccurately, administrative fine amount to 2.195 TRY is applied according to related law.
- 2- DATA IS COLLECTED FOR ONLY STATISTICAL PURPOSES and "COMPLETELY CONFIDENTIAL". Data recorded in this survey can not be used for imposition or investigation aims.
- 3- UNIT PRICE of the PRODUCED PRODUCT WILL BE CALCULATED by UNIT PRICE of the SOLD PRODUCTION. VALUES of PRODUCTION and SALES WILL be EXCLUDED VAT and SPECIAL CONSUMER TAX.
- 4- PLEASE RETURN INFORMATION of the PREVIOUS MONTH until 25 th. DAY of Each MONTH.

PART 1. INFORMATION of ENTERPRISE's TITLE and ADDRESS

- | | |
|---|--|
| 1. Name of the enterprise <input style="width: 95%;" type="text"/> | 2. Name of the tax administration <input style="width: 95%;" type="text"/> |
| 3. Tax identification number <input style="width: 95%;" type="text"/> | |
- | | |
|--|---|
| 4. Has the enterprise's name and address changed? <input type="checkbox"/> 1. Yes (Note the changes to question 5) <input type="checkbox"/> 2. No (Go to PART 2) | 5. Address <input style="width: 98%;" type="text"/> |
|--|---|

PART 2. INFORMATION OF TURNOVER FOR THE ENTERPRISE (Excluding Kurus)

1. TURNOVER

1.1. Total Turnover of the Reference Month TRY

Note: Total turnover, should be equal to the sum of non-domestic and domestic turnover.

1.2. Non-Domestic Turnover of the Reference Month TRY

Note: Export listed sales should be included in non-domestic turnover.

1.3. Domestic Turnover of the Reference Month TRY

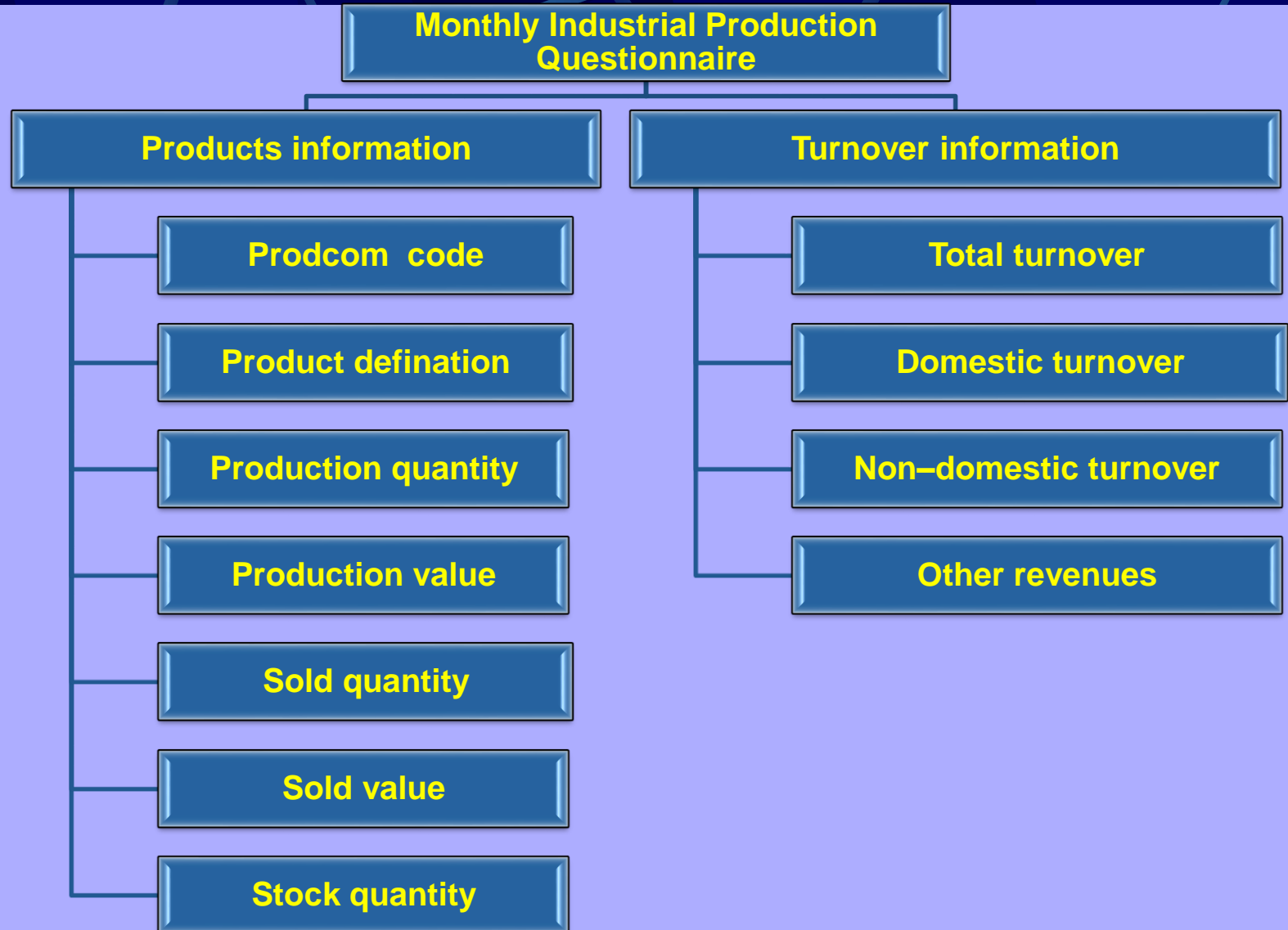
2. TOTAL VALUE OF THE SERVICE, THE COMMERCIAL PRODUCT, SUBCONTRACTING ETC.

(Sum of the income except sales from production for the reference month) TRY

Note: This turnover should be shown in the non-domestic and / or domestic turnover.

Please indicate the increase/decrease at the turnover for the previous month.

Compiled variables



Quantity of production:

It is the quantity of production which is produced either in the enterprise or produced by another enterprise by giving raw material of the enterprise in the consistent month. The subcontracting by using other enterprises raw materials is not included.

Value of Production:

It is the value of production which is produced either in the enterprise or produced in another enterprise by giving raw material of the enterprise in the consistent month.

Quantity of Sales:

The quantity of sales includes the products which are produced either in the enterprise or produced by another enterprise with the raw materials of the enterprise which is included in survey and sales from the stocks of the enterprise and the products given to other departments of the enterprise in the consistent month. The commercial goods sold without any changes on them are not included.

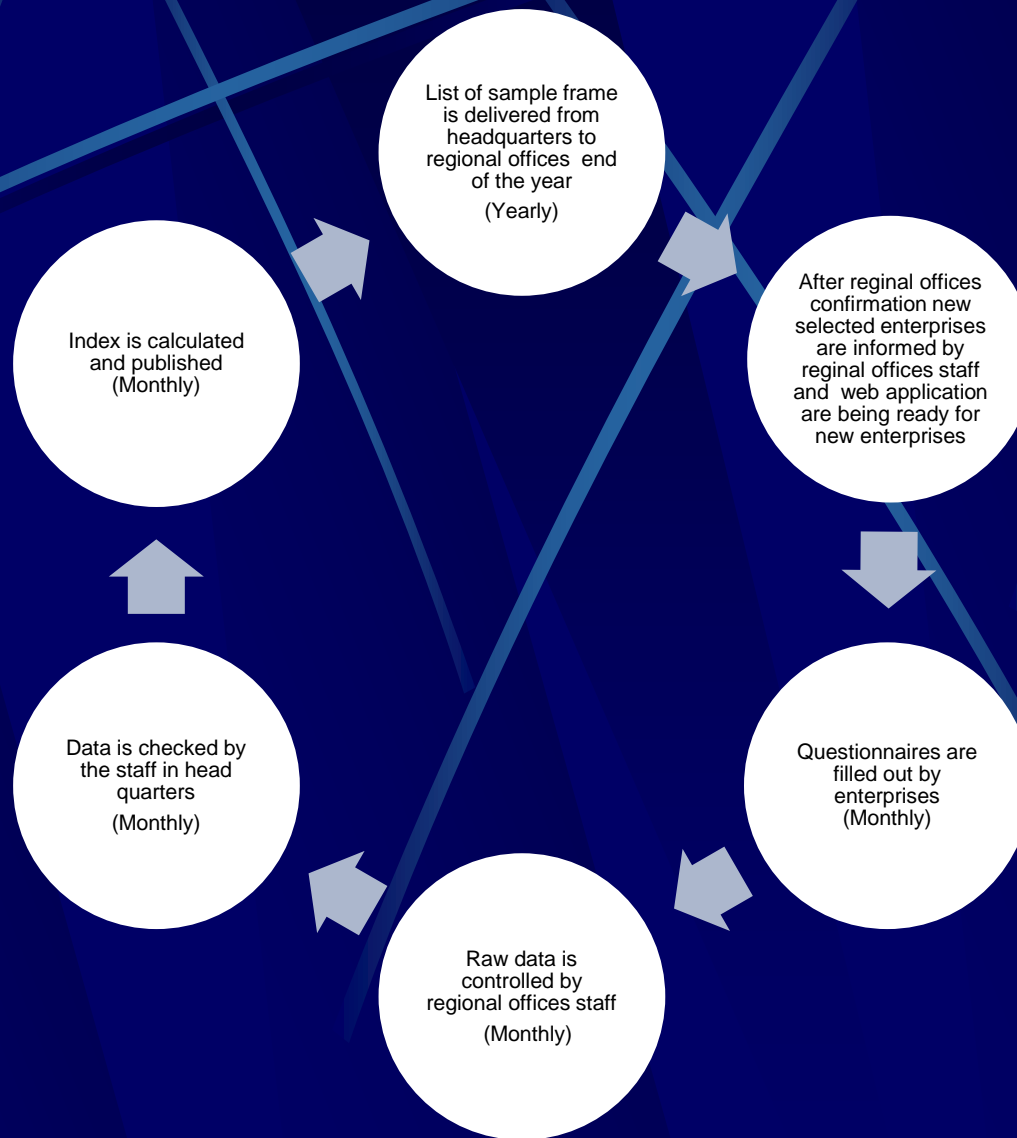
Value of Sales:

The value of sales includes the value of the products (by using producer's price) which are produced either in the enterprise or by another enterprise with the raw materials of the enterprise which is included in survey and sales from the stocks of the enterprise and the products given to other departments of the enterprise in the consistent month.

Producer's price :

Producer's price is the price received by a producer for a unit of a good including any tax payable or subsidy receivable on the product as a consequence of its sale or use except invoiced VAT, Special consumption tax . It also excludes any delivery charges invoiced separately by the producer.

Index of Industrial Production in Turkey



Index Methodology

Laspeyres index methodology is used in order to calculate industrial production index.

$$L_q = \frac{\sum_{i=1} P_{i,0} Q_{i,t}}{\sum_{i=1} P_{i,0} Q_{i,0}} 100 = \sum_{i=1} (W_{i,0} \frac{Q_{i,t}}{Q_{i,0}}) 100$$

L_q = Laspeyres volume index

$Q_{i,0}$ = product i production quantity in base year

$Q_{i,t}$ = product i production quantity in period t

$P_{i,0}$ = product i price in base year

$w_{i,0}$ = product i weight in base year

Calculations made

While calculation of the index; mainly **production quantity** of the commodities are used.

However in some commodities which have volatile unit prices like drugs **production value** is used. In this case, Producer Price Index is used as a deflator. In addition to this in long term production sectors like ship and train construction, **hours worked** is used.

Weight of records;

- ↪ 89,3% quantity data is used
- ↪ 10,3% value data is used (deflated by ppi)
- ↪ 0,4% hours worked is used.

Deflation

There are two ways to calculate value series at constant prices.

- One of them is, to calculate value at constant prices, calculating base year prices for all commodities and multiplying quantities for the following months by these prices.
- The other is to deflate the value series by appropriate producer price indexes.

Base year

Base year of industrial production index is 2010=100.

Every five years (ending with 0 and 5) base year is revised and after three years this revision is done.

Type of index

Fix Base weighted Laspeyres index.

Sector Coverage

- ↗ Mining and quarrying
- ↗ Manufacture
- ↗ Electricity, gas, steam and air conditioning supply

Unrecorded activity

- ↗ 07.21,
- ↗ 35.12,
- ↗ 35.13,
- ↗ 35.14,
- ↗ 35.2,
- ↗ 35.3 and 38 sectors of NACE Rev.2 are not covered.

Coverage

Geographical Coverage;

↪ All Turkey

Size classes covered

- ↪ For mining and quarrying and manufacturing, the establishments representing 90% of production value for each economic activity are included.
- ↪ For electricity generation, data are collected from the regulator which covers all units, regardless of size.

Reporting unit

Local Unit or enterprises

Observation unit (s)

Mining and quarrying, and manufacturing: establishments (local unit); exceptionally manufacturing enterprises may be surveyed.

Periodicity

Monthly

Timeliness

The results of the monthly production index are released on the 8th day of the second month following the reference month.

Data collection media

Data are entered by enterprises via web application.

Timetable of data collection

Monthly data are entered by enterprises till end of next month and controlled by regional staff at the same time.

Sample

Non-random sample

Criteria for stratification

For each economic activity, products are ranked according to their share of the value of production of the economic activity.

The largest products are selected until 95% of the value of production is reached.

For each products units are ranked according to their share of the value of production of the economic activity.

The largest enterprises are selected until 90% of the value of production is reached.

Once a unit is included in the sample for an economic activity, it is required to provide data for all of its products.

Advance dissemination of release calendar

At the end of each year TurkSTAT publishes a release calendar providing the release dates for the coming year. This is also disseminated on TurkSTAT's internet website (www.tuik.gov.tr).

Simultaneous release to all interested parties

Data are released simultaneously to all interested parties by issuing the press release. The press release is subsequently posted on TurkSTAT Internet website.

Type of source

Main data sources is statistical surveys but some administrative data are derived from Turkey Electricity Generation Company and Tobacco and Alcohol Market Regulatory Authority.

Some derived admin data are used just for controlling such as sugar, steel, automotive and cement production.

Data

The enterprises have 20+ employees and produces 80% of value added in each four digit economical activity.

- ⇒ 5074 enterprises are chosen for the index;
- ⇒ 1872 products are chosen for the index;
- ⇒ 230 four digit economical activities are covered in the index

Classification

Statistical Classification of Economical Activities in the European Community 2nd Revision (NACE Rev.2) is used for activity classification.

Main industry Group (MIGs) is used for industry group.

PRODCOM 2010 Classification is used for product classification.

Weights

Source of weight

Weights for activity are taken from 2010 results of Annual Business Statistics Department. Weights for products are taken from 2010 results of Short Term Business Statistics Department.

- ↪ Below the 4-digit indices production value weights is used (Monthly PRODCOM Survey)
- ↪ For the higher level indices such as two digit, section and MIGS level, value added weights are used. (SBS Survey)

Current Weights

2010

Frequency for updating weights

Every five years

Weights

NACE Rev.2

2010=100

B- Mining and quarrying

6,05%

C- Manufacture

81,51%

D- Electricity, gas, steam and
air conditioning supply

12,44%

Total Industry

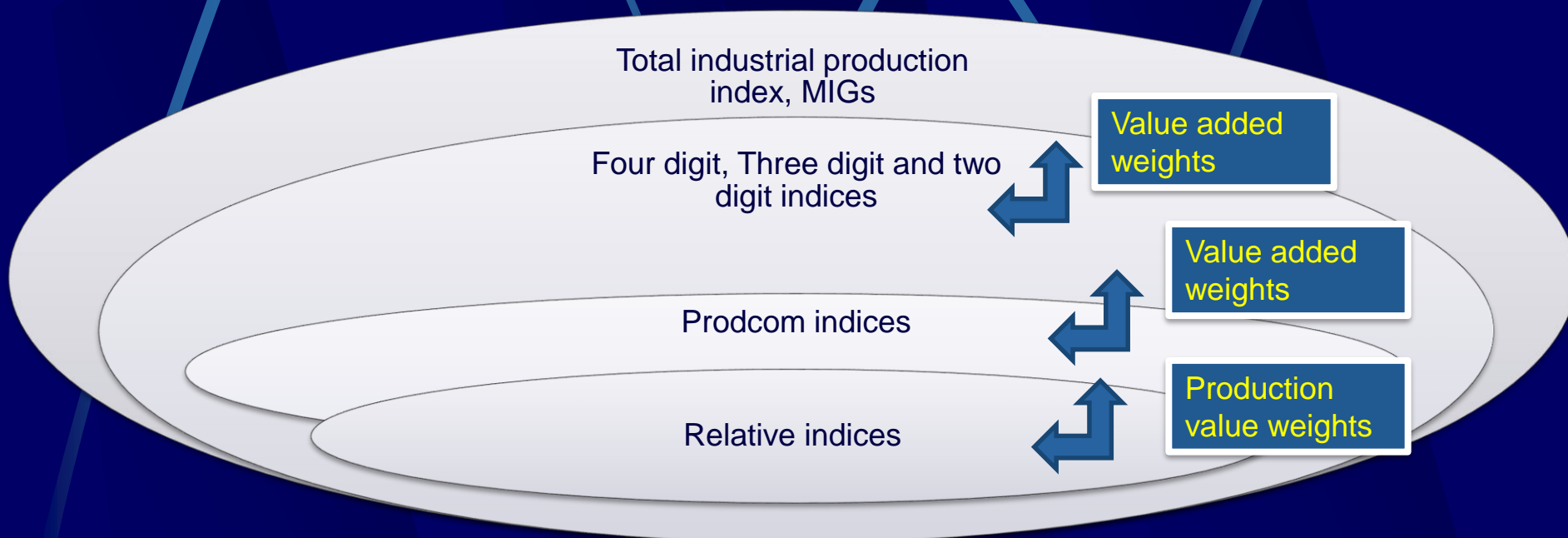
100%

Index of Industrial Production in Turkey

Main industry group weights

<u>MIGs</u>	<u>2010=100</u>
Intermediate goods	37,99%
Durable consumer goods	4,97%
Non-durable consumer goods	23,91%
Energy	16,66%
Capital goods	16,46%
Total Industry	100%

Structure of industrial production index



Process of Data

There are so many different methods for analyzing data.

For micro editing

- ↗ Previous month growth ($m-1$)
- ↗ Same month of the previous year growth ($m-12$)
- ↗ Box plot (to identify outliers)
- ↗ Consistency check
- ↗ Contribution check at enterprises level

Process of Data

For macro editing;

- ↗ Consistency checks
- ↗ Model based approach (TSW/Terror)
- ↗ Contribution check at four digit and PRODCOM level

Process of Data Estimates for non-response;

- ↪ If enterprises refuse to respond, the unit is reminded of its legal obligation to respond. But if the problem persists, imputation process is applied for the unit on product level. The quantity and the value of the products in previous month of the enterprise which does not respond in a reference month are enlarged by using the growth rates of the quantity and the value of products of responding enterprises compared to the previous month.
- ↪ For the establishments showing seasonality, the growth rate of the same month of the previous year is used.

Process of Data

Treatment of missing data:

- ↪ When data are temporarily missing because of seasonally or production stoppage, they are imputed by 0, so it is obvious that selected units were not produced in the reference period.
- ↪ When data is checked and imputation is done, industrial production index is calculated and published on 8th of each month.

Publication

Adjusted data has been published in 3 different ways.

- 1- “**Calendar adjusted**” data is derived from unadjusted data by removing calendar and holiday originated effects. Calendar adjusted data should be used in comparisons regarding the same month/period of the previous year.
- 2- “**Seasonally adjusted**” data is derived from unadjusted data by removing effects originating from seasonal effects. Seasonally adjusted data should be used in comparisons regarding the previous month/period.
- 3- If unadjusted data contains both calendar and holiday, and seasonal effects, “**seasonally and calendar adjusted**” data is derived by removing these effects. Seasonally and calendar adjusted data should be used in comparisons regarding the previous month/period.

No: 24734

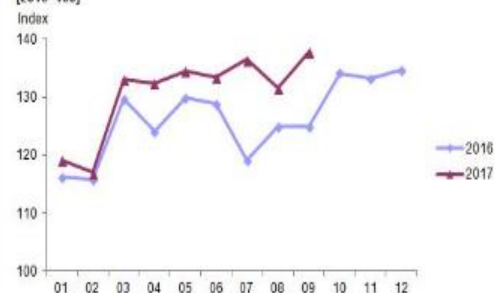
08 November 2017

Hrs: 10:00

Industrial Production Index, September 2017

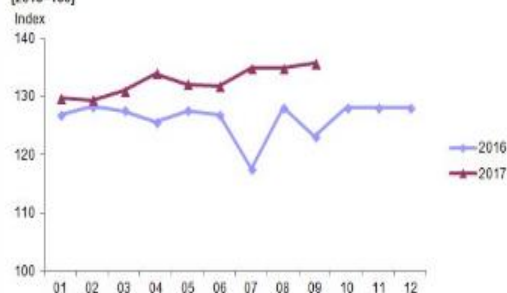
Industrial production increased by 10.4% compared with same month of previous year

When the sub sectors of the calendar adjusted industrial sector (based on 2010=100) were examined, mining and quarrying index increased by 4.8%, manufacturing index increased by 10.4% and electricity, gas, steam and air conditioning supply index increased by 13% in September 2017, compared with same month of previous year.

Calendar adjusted industrial production index, September 2017
[2010=100]

Industrial production increased by 0.6% compared with previous month

When the sub sectors of the seasonally and calendar adjusted industrial sector (based on 2010=100) were examined, mining and quarrying index increased by 5.7%, manufacturing index increased by 0.2% and electricity, gas, steam and air conditioning supply index increased by 1.6% in September 2017, compared with previous month.

Seasonally and calendar adjusted industrial production index, September 2017
[2010=100]

Industrial production index and the rate of change, September 2017

Metadata	Close
Analytical Framework, Concepts, Definitions, and Classifications	
Scope of the Data	
Accounting Conventions	
Characteristics of Basic Data Sources	
Compilation Practices	
Revisions	
Other subjects	
Footnotes	

Tables;

Table-1: Industrial Production Index (2010=100)

Table-2: Calendar Adjusted Industrial Production Index (2010=100)

Table-3: Seasonal and Calendar Adjusted Industrial Production Index (2010=100)

Table-4: Calendar Adjusted Percentage Change over the Same Month of the Previous Year

Table-5: Seasonal and Calendar Adjusted Percentage Change over the Previous Month

Seasonal Adjustment

Currently, TurkSTAT carries out the seasonal adjustment of industrial production indexes, using TRAMO-SEATS methodology based on ARIMA (Autoregressive Integrated Moving Average) model estimation developed by the Banco de Espana and also suggested by Eurostat.

The software that is used for the application of this method is TRAMO-SEATS for Windows (TSW).

Why seasonally adjust?

- ↪ To allow series to be compared from month to month, quarter to quarter
- ↪ To aid in short term forecasting
- ↪ to see the real movements and turning points
- ↪ To aid comparison of time series from different countries

Why Chain Index ?

The current STS regulation allows to update the weights used for calculation of indices in STS every five years or more frequently, meaning yearly in combination with annual chain linking.

From a methodological point of view, annually chained indices are often considered as a superior approach for short-term statistics because of the use of more recent weighting information.

Why Chain Index ?

- Chain-linking has a further and more practical advantage, in that it facilitates continuous yearly introduction of new products or new enterprises into the sample.
- Conventional rebasing only every 5 years means there comes a point where the weights are 8 years old.

Why Chain Index ?

- The best comparison between recent periods is made with recent weights rather than the weights of a remote base year.
- The international System of National Accounts (SNA 1993) and the European System of Accounts (ESA 1995) recommend chain linking.

Why Chain Index ?

➤ There are three different methods for compiling chain index

➤ Annual overlap

➤ Quarterly overlap

➤ Over-the-year technique

$$VI_n^{LC} = \left[\frac{\sum_i (P_{i,0} x Q_{i,1})}{\sum_i (P_{i,0} x Q_{i,0})} \right] x \left[\frac{\sum_i (P_{i,1} x Q_{i,2})}{\sum_i (P_{i,1} x Q_{i,1})} \right] x \dots x \left[\frac{\sum_i (P_{i,n-1} x Q_{i,n})}{\sum_i (P_{i,n-1} x Q_{i,n-1})} \right]$$

Why Chain Index ?

Target method for annual chain-linking volume indices:

- ↘ For STS volume indices, e.g. IPI, the recommended method (target method) is the annual overlap.
- ↘ The chaining period is the average month of the previous year

Why Chain Index ?

Target method for annual chain-linking of the price indices:

- ↪ For monthly STS price indices, e.g. PPI, the recommended method (target method) is the one month overlap chained Laspeyres index.
- ↪ The chaining period is December of the previous year. Weights have to be price-updated up to December of the previous year.

Reconstructing of the historical series of indices - Linking

The term linking indices refer to linking two index series together to produce a time series.

Monthly index of generic series S_j in base b relating to month i and year t , the corresponding index, updated to base c and relating to month i and year t is obtained as follows:

$${}_c I_{i,t}^{S_j} = {}_b I_{i,t}^{S_j} \frac{1}{{}_b \bar{I}_c^{S_j}} 100$$

where represents the average for year c of the monthly indices for generic series S_j in base b

Production value versus quantity

Production values reflect the price changes based on both the inflation and quality changes. Price and quality changes over time must be taken into account while compiling IPI.

- ⇒ Using just quantity in compilation of IPI is only valid in the case of homogeneous products.
- ⇒ Production value should be used instead of quantity where products are more heterogeneous.

Deflation

Deflation is not necessary when output quantities are used.

With quantity relatives deflation is not necessary but the problem of quality changes occurs. Quantities ignore quality changes.

Quality changes of a product are incorporated in the value of that good and consequently in the indices that are based on value series.

In order to exclude pure price effects from value series a deflation with the appropriate price indices is necessary.

Deflation

Deflation is defined as isolating the volume component (that is quantity and quality) from variables that have price and volume elements.

- ↪ Deflation is recommended in particularly heterogeneous product due to the relative stability of prices
- ↪ Importantly, the quality changes associated with changing, new and disappearing products can be properly reflected when current values are deflated by price indices.

Benchmarking

Statistical techniques which are aimed to ensure coherence between time series data of the same target variable measured at different frequencies, e.g., sub-annual and annual.

Low frequency data tends to be more comprehensive and accurate than high frequency data.

Consistency between raw and seasonally adjusted data is required.

Benchmarking

The best statistical practice is to benchmark the data to the latest information from the SBS. When SBS data is compiled from annual surveys, they are generally more comprehensive than the surveys used for the STS.

There are two main approaches to benchmarking of time series

- ↪ purely numerical approach and
- ↪ statistical modeling approach.

Thank you for your attention...