Quarterly Index of Industrial Production (QIIP)

3rd Quarter 2006

1.   Introduction

The Index of Industrial Production shows the evolution of the volume of output of the Industrial Sector which covers "Mining and quarrying", "Manufacturing" and "Electricity, gas and water supply" and which accounts for around 22% of Gross Domestic Product (GDP).

The index compiled on a quarterly basis is one of the most important industrial short-term indicators which aim at measuring, on a quarterly basis, the changes in the volume of industrial output.

This issue of "Economic and Social Indicators" presents a new series of quarterly indices for the period 2003 to 3rd quarter of 2006 with 2002 as base year. The weights have been updated in the light of the results of the 2002 Census of Economic Activities to take into account changes in the production pattern of the sector. This new series is therefore not strictly comparable with previously published series.

The indices are given separately for the three sections, namely, "Mining and quarrying", "Manufacturing" and "Electricity, gas and water supply". Within "Manufacturing", estimates by broad group, namely, EPZ, Non-EPZ and "Sugar milling" as well as by main industrial grouping are also given. Wherever possible, the annual averages of the quarterly indices have been worked out and included in the tables. It is to be noted that, due to incomplete data, indices for the third quarter 2006 are provisional and published at section and broad group level only. They are therefore subject to revision in future issues of the indicator.

The published indices are not seasonality adjusted. The user is therefore advised to base comparisons for a particular period of a year on the corresponding period of the previous year.

The objectives of the QIIP, the sources and methodology used in the compilation of the index as well as the limitations of the index are given at annex.

2.   The overall index - Industrial Sector

In the third quarter 2006, the overall index of industrial production was 3.1% lower than the previous quarter and 5.4% higher than the corresponding quarter of 2005. In the year to 3rd quarter 2006, i.e., 4th quarter 2005 to 3rd quarter 2006, real industrial output went up by 2.1% compared to the same period a year ago. This is explained mainly by increases of 5.8% and 5.5% in the real output of the Non-EPZ and "Electricity, gas and water supply" respectively, partly offset by decreases of 6.0% in "Sugar milling" and 1.4% in EPZ (Table 1). The long-term trend (4-quarter moving average), as shown graphically by Chart 1, shows that the upward tendency as from the 1st quarter 2006 is maintained.
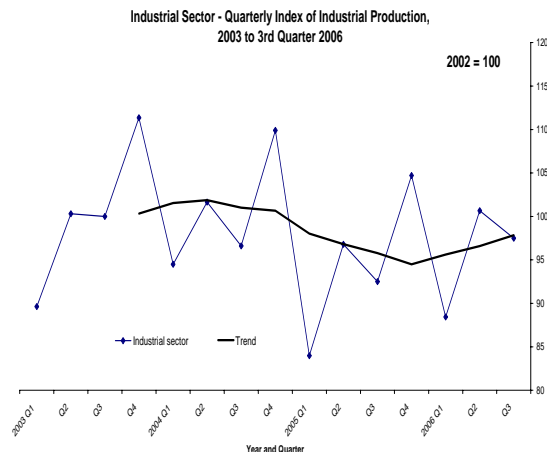

Industrial Sector - Quarterly Index of Industrial Production, 2003 to 3rd Quarter 2006

2002 = 100

Chart 1

3. Changes by section

3.1 Mining and quarrying

"Mining and quarrying", is restricted to activities relating to quarrying of decorative stones, sand and salt extraction and represents only half a percent of the total weight allocated to the industrial sector. In the 3rd quarter 2006, real output increased by 16.8% compared to the previous quarter, and by 26.4% compared to the corresponding quarter of 2005, mainly due to higher sand extraction activities during the third quarter of 2006. In the year to 3rd quarter 2006, real output went up by 3.1% (Table 1).
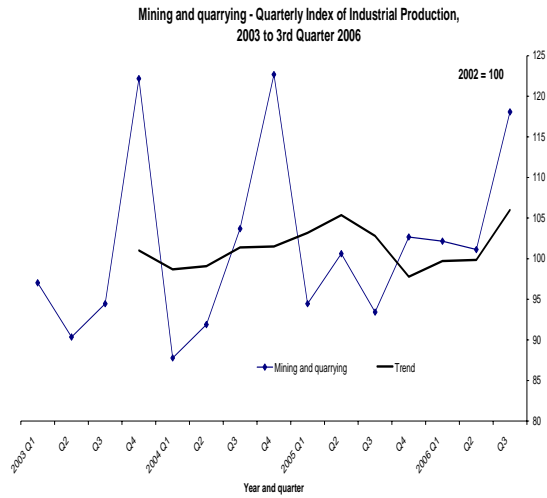
Mining and quarrying - Quarterly Index of Industrial Production, 2003 to 3rd Quarter 2006

2002 = 100

Mining and quarrying — Trend

Year and quarter

Chart 2

3.2 Manufacturing

Manufacturing output, which covers the production of a wide range of goods, represents nearly 90% of the output of the industrial sector. For analysis purposes, "Manufacturing" is broken down into the following broad groups:

- Sugar milling representing around 5% of manufacturing output
- EPZ (55%)
- Non–EPZ (40%)

Manufacturing - Quarterly Index of Industrial Production, 2003 to 3rd Quarter 2006

2002 = 100

- Total manufacturing
- Total excl. sugar milling
- Trend (Total excl. sugar milling)

Year and quarter

Chart 3

% growth in manufacturing output in the year to 3rd Quarter 2006

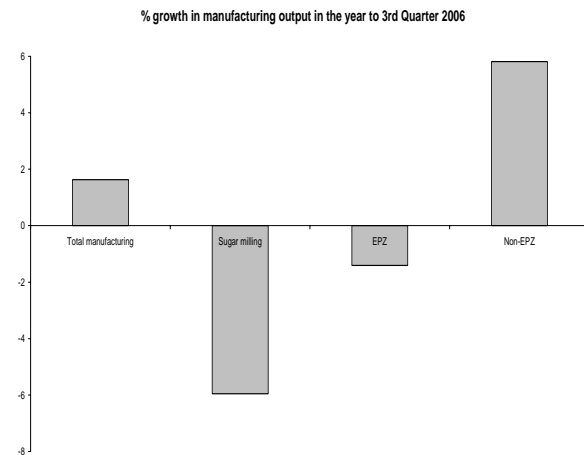Total manufacturing | Sugar milling | EPZ | Non-EPZ

Chart 4

Manufacturing output in the 3rd quarter 2006 decreased by 2.0% compared to the previous quarter, but increased by 5.2% when compared to the same quarter a year ago (Table 1). In the year to 3rd quarter 2006, it increased by 1.6%. This is explained by increases of 5.8% in Non-EPZ, partly offset by the negative performances of EPZ (-1.4%) and "Sugar milling" (-6.0%). The performances of the EPZ and the Non-EPZ excluding "Sugar milling" by detailed industry group up to 2nd quarter 2006 are analysed separately in Section 4. As mentioned in the introduction, due to incomplete data, indices for the 3rd quarter 2006 are provisional and published at section and group level only.

3.3   Electricity, gas and water supply

"Electricity, gas and water supply" accounts for around 11% of the output of the industrial sector. In the 3rd quarter 2006, real output of this section decreased by 10.6% compared to the previous quarter, but increased by 6.3% when compared to the same quarter, a year ago. In the year to 3rd quarter 2006, it is estimated to have moved up by 5.5% (Table 1).
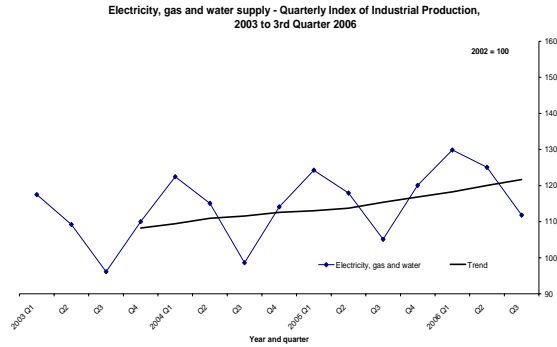
Electricity, gas and water supply - Quarterly Index of Industrial Production, 2003 to 3rd Quarter 2006

2002 = 100

Year and quarter

Electricity, gas and water   Trend

Chart 5

4.   Changes by broad group

4.1   EPZ

Real output of the EPZ decreased by 6.1% in the 3rd quarter 2006 compared to the previous quarter, but increased by 4.8% when compared to the same quarter, a year ago. In the year to 3rd quarter 2006, it is estimated to have gone down by 1.4% (Table 1).

Indices by main industrial grouping for the 3rd quarter of 2006 are not available. However, an indication of the annual performance at this level can be obtained by comparing the detailed indices available for year ending 2nd quarter 2006 to the corresponding period a year ago (Table 3). Real output of "Wearing apparel", the most important industrial grouping within the EPZ, dropped by 8.1% and that of "Textiles" fell by 4.3%. These two sub-groups account for 86.6% of the total weight allocated to the EPZ. Moreover, the production of chemicals and man-made fibres fell by 26.2% in real terms. On the other hand, significant increases were noted in "Food products" (+65.6%) and "Optical instruments, watches and clocks" (+28.5%). Details of changes at sub-group level are shown in Chart 7.

EPZ - Quarterly Index of Industrial Production, 2003 to 3rd Quarter 2006
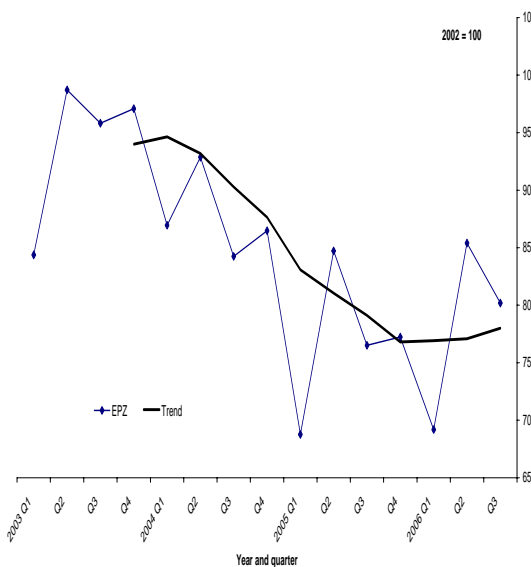
2002 = 100

EPZ   Trend

Year and quarter

EPZ output: % growth in the year to 2nd quarter 2006

EPZ sector   Food products   Textiles   Wearing apparel   Chemicals, etc   Watches and clocks, etc   Other
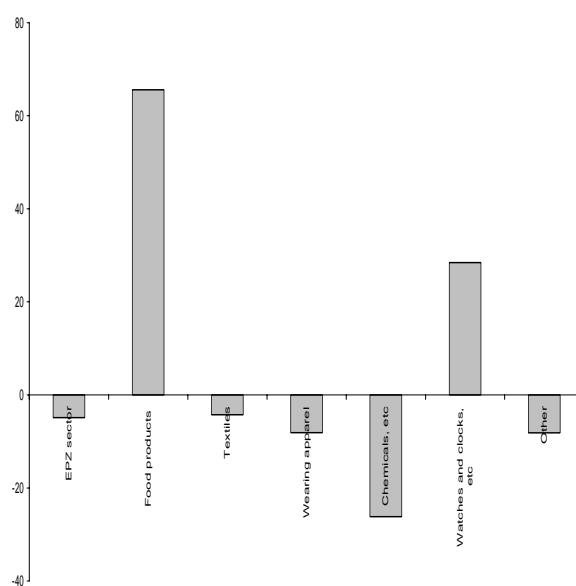
Chart 6

Chart 7

4.2 Non-EPZ excluding "Sugar milling"

The index for the Non-EPZ refers to large establishments only (see methodology at annex). Provisional estimate of real output of large Non-EPZ establishments shows increases of 1.1% in the 3rd quarter 2006 compared to the previous quarter and of 5.0% compared to the same quarter, a year ago. For the year to 3rd quarter 2006, the index increased by 5.8% (Table 1). The corresponding growths up to the 3rd and 4th quarters of 2005 were 0.4% and -1.9% respectively while that for the year to 1st and 2nd quarters of 2006 were 1.4% and 4.2% respectively, indicating recovery in the sector.

An indication of the annual performance at sub-group level is obtained by comparing the detailed indices available for year ending 2nd quarter 2006 with those for the year ending 2nd quarter 2005 (Table 4). Decreases were registered in all industrial groupings except "Food products excluding sugar" (+18.0%) and "Other manufacturing" (+5.5%). Main decreases were as follows: "Beverages and tobacco" (-3.8%), "Chemical and man-made fibres" (-9.4%), "Non-metallic mineral products" (-0.3%) and "Basic metals and metal products" (-23.4%).
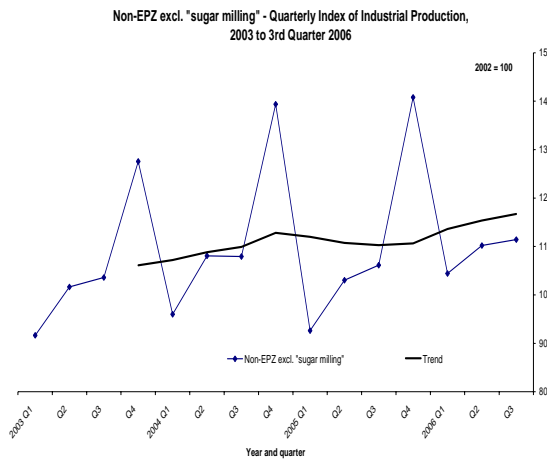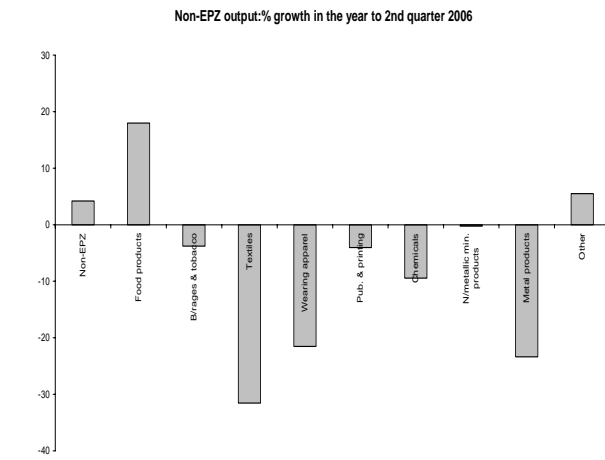

Chart 8

Chart 9

Central Statistics Office
Ministry of Finance and Economic Development
PORT LOUIS
December 2006

Table 1: Index of industrial production by section - annual and quarterly indices, 2003 to 3rd Quarter 2006

Year 2002 = 100

	Industrial sector	Mining and quarrying	Manufacturing Total	Total exc. sugar milling	Sugar milling [1]	EPZ	Non-EPZ [2]	Electricity, gas and water supply
NSIC Rev. 3	10 - 37, 40, 41	10 - 14	15 - 37	15-37 exc. 1542	1542	15 - 37	15 - 37	40, 41
Weight	1000	3	890	845	45	486	358	108
Annual								
2003	100.3	101.0	99.4	99.1	103.7	94.0	106.1	108.2
2004	100.7	101.5	99.2	98.5	110.5	87.6	112.8	112.6
2005	94.5	97.8	91.8	91.1	99.8	76.8	110.6	116.8
Quarterly								
2003 Q1	89.6	97.0	86.2	87.5	63.8	84.4	91.6	117.5
Q2	100.3	90.3	99.3	100.0	86.4	98.7	101.7	109.2
Q3	100.0	94.5	100.5	99.1	126.1	95.8	103.6	96.1
Q4	111.3	122.2	111.5	110.0	138.6	97.1	127.6	110.0
2004 Q1	94.5	87.8	91.1	91.9	67.9	87.0	96.0	122.5
Q2	101.7	91.9	100.1	100.1	92.0	92.9	108.1	115.1
Q3	96.6	103.7	96.3	94.4	134.3	84.2	107.9	98.6
Q4	109.9	122.7	109.4	107.4	147.6	86.5	139.4	114.1
2005 Q1	84.0	94.5	79.1	79.5	61.3	68.8	92.6	124.3
Q2	96.8	100.6	94.2	94.3	83.1	84.7	103.0	117.9
Q3	92.5	93.4	91.0	89.4	121.3	76.5	106.1	105.1
Q4	104.7	102.7	102.9	101.3	133.5	77.2	140.8	120.1
2006 Q1	88.4	102.2	83.4	84.1	58.9	69.2	104.4	129.9
Q2	100.7	101.1	97.7	98.1	79.8	85.4	110.2	125.1
Q3 [3]	97.5	118.1	95.7	94.5	116.5	80.2	111.4	111.8
% change, latest quarter over: [3]								
previous quarter	-3.1	16.8	-2.0	-3.6	46.0	-6.1	1.1	-10.6
same quarter a year ago	5.4	26.4	5.2	5.7	-4.0	4.8	5.0	6.3
% growth in output in the year to: [3]								
3rd quarter 2006	2.1	3.1	1.6	2.0	-6.0	-1.4	5.8	5.5

[1] figures for 2005 to 3rd quarter 2006 are provisional   [2] large, i.e establishments with 10 or more employees   [3] provisional

Table 2: Index of industrial production by main industrial grouping - manufacturing[1], 2003 to 2nd quarter 2006

Year 2002 = 100

	Total manufacturing	Food products inc. sugar	Beverages and tobacco	Textiles	Wearing apparel	Publishing and printing	Chemicals and man-made fibres	Non-metallic mineral products	Basic metals and metal products	Other
NSIC Rev. 3	15 - 37	151 - 154	155, 160	17	18	22	23 - 25	26	27, 28	19 - 21, 29 - 37
Weight	1000	155	89	62	431	39	67	37	36	84
Annual										
2003	99.4	109.5	97.7	97.7	90.4	112.9	121.6	101.7	112.8	99.0
2004	99.2	115.8	92.0	92.2	80.5	115.4	106.5	93.5	193.4	117.0
2005	91.8	119.7	84.0	80.8	68.7	107.0	82.0	83.2	222.2	111.0
Quarterly										
2003 Q1	86.2	89.1	84.8	84.7	83.0	95.6	91.8	90.1	95.1	86.1
Q2	99.3	99.2	87.6	96.1	97.4	109.3	109.4	104.1	120.9	99.5
Q3	100.5	117.8	92.2	103.0	90.6	106.4	125.3	102.0	115.0	96.7
Q4	111.5	131.9	126.0	107.0	90.6	140.2	159.9	110.6	120.1	113.6
2004 Q1	91.1	93.7	78.6	87.3	80.7	104.5	97.6	86.5	142.0	102.1
Q2	100.1	113.2	87.0	105.5	85.2	118.9	100.1	100.0	147.7	113.3
Q3	96.3	126.1	89.5	90.4	75.3	99.7	109.7	90.5	156.8	123.2
Q4	109.4	130.2	113.0	85.8	80.6	138.6	118.5	97.0	327.1	129.5
2005 Q1	79.1	90.4	72.0	71.5	62.6	95.5	69.0	65.1	170.0	97.6
Q2	94.2	108.5	75.7	82.9	76.4	104.6	78.7	86.7	209.8	114.3
Q3	91.0	127.6	75.1	82.5	67.7	96.9	77.6	84.9	210.7	111.3
Q4	102.9	152.4	113.4	86.4	68.2	130.8	102.8	96.2	298.2	120.8
2006 Q1	83.4	111.7	74.2	63.3	60.4	96.7	70.2	73.9	253.4	112.4
Q2	97.7	138.0	74.3	73.6	73.7	92.4	78.9	83.5	264.3	128.5
% change, latest quarter over:										
previous quarter	17.2	23.6	0.1	16.1	22.1	-4.4	12.3	13.0	4.3	14.3
same quarter a year ago	3.7	27.2	-1.9	-11.2	-3.5	-11.7	0.2	-3.7	26.0	12.4
% growth in output in the year to:										
2nd quarter 2006	-1.1	16.4	-3.8	-7.5	-8.4	-4.9	-12.4	-0.3	18.9	1.8

[1] Non-EPZ includes large establishments only

Table 3: Index of industrial production by main industrial grouping - EPZ, 2003 to 2nd quarter 2006

	EPZ, manufacturing	Food products	Textiles	Wearing apparel	Chemicals and man-made fibres	Optical instruments, watches & clocks	Other
NSIC Rev. 3	15 - 37	151 - 154	17	18	23 - 25	33	19 - 22, 26 - 32, 34 - 37
Weight	1000	40	99	767	26	11	57
Annual							
2003	94.0	116.9	94.7	90.5	158.0	83.9	96.7
2004	87.6	135.5	87.2	80.0	124.1	152.0	108.8
2005	76.8	154.4	78.4	68.2	76.0	227.5	98.9
Quarterly							
2003 Q1	84.4	107.4	84.2	83.0	96.6	87.6	80.8
Q2	98.7	101.3	95.7	98.0	131.0	85.8	100.0
Q3	95.8	127.1	103.4	91.0	169.5	77.3	95.6
Q4	97.1	131.9	95.8	89.9	234.9	85.0	110.3
2004 Q1	87.0	117.2	83.1	80.7	125.2	100.3	115.3
Q2	92.9	141.5	101.5	85.1	127.9	118.3	103.4
Q3	84.2	153.5	85.3	74.8	126.1	184.6	110.4
Q4	86.5	129.7	78.8	79.3	117.3	204.9	106.0
2005 Q1	68.8	111.4	67.4	62.0	65.5	219.3	92.0
Q2	84.7	163.7	81.6	76.0	89.4	239.0	109.6
Q3	76.5	162.4	81.7	67.3	69.3	227.0	99.6
Q4	77.2	180.2	82.9	67.5	79.9	224.8	94.4
2006 Q1	69.2	202.3	61.4	60.1	66.2	337.2	93.9
Q2	85.4	379.5	73.6	73.5	78.7	300.1	95.9
% change, latest quarter over:							
previous quarter	23.4	87.5	19.9	22.4	18.8	-11.0	2.1
same quarter a year ago	0.8	131.8	-9.7	-3.2	-12.0	25.6	-12.5
% growth in output in the year to:							
2nd quarter 2006	-4.9	65.6	-4.3	-8.1	-26.2	28.5	-8.2

Table 4: Index of industrial production by main industrial grouping - Non-EPZ exc. Sugar [1], 2003 to 2nd quarter 2006

Year 2002 = 100

	Non-EPZ, manufacturing	Food products exc. sugar	Beverages and tobacco	Textiles	Wearing apparel	Publishing and printing	Chemicals and man-made fibres	Non-metallic mineral products	Basic metals and metal products	Other
NSIC Rev. 3	15-37	151-154	155,160	17	18	22	23 - 25	26	27, 28	19 - 21, 29 - 37
Weight	1000	206	221	20	30	91	130	93	87	124
Annual										
2003	106.1	111.2	97.7	117.8	88.1	113.2	111.6	101.7	113.3	102.5
2004	112.8	113.6	92.0	97.9	96.6	112.9	98.1	93.5	132.2	117.0
2005	110.6	120.0	84.0	70.2	78.8	106.8	79.3	83.2	99.7	103.0
Quarterly										
2003 Q1	91.6	100.0	84.8	88.0	82.0	96.9	90.5	90.1	95.4	88.7
Q2	101.7	106.5	87.6	99.5	78.7	109.9	103.5	104.1	121.2	101.1
Q3	103.6	110.3	92.2	100.5	77.9	106.5	113.2	102.0	115.4	100.1
Q4	127.6	127.8	126.0	183.4	113.8	139.6	139.4	110.6	121.0	120.2
2004 Q1	96.0	102.2	78.6	84.4	78.5	100.8	88.1	86.5	96.5	94.9
Q2	108.1	117.8	87.0	89.3	83.2	116.2	90.4	100.0	100.4	119.7
Q3	107.9	114.2	89.5	97.3	89.9	98.7	101.3	90.5	105.4	120.9
Q4	139.4	120.1	113.0	120.7	134.8	135.9	112.6	97.0	226.4	132.5
2005 Q1	92.6	98.9	72.0	82.5	74.1	95.0	66.2	65.1	76.2	84.9
Q2	103.0	106.7	75.7	60.1	77.9	105.0	71.8	86.7	93.0	99.4
Q3	106.1	120.9	75.1	54.7	73.2	96.7	75.7	84.9	93.6	103.0
Q4	140.8	153.5	113.4	83.7	90.0	130.5	103.3	96.2	135.8	124.7
2006 Q1	104.4	124.4	74.2	57.5	63.0	96.0	66.5	73.9	74.0	104.9
Q2	110.2	120.1	74.3	50.9	69.3	93.9	73.1	83.5	80.5	129.0
% change, latest quarter over:										
previous quarter	5.5	-3.5	0.1	-11.4	10.0	-2.2	10.0	13.0	8.8	22.9
same quarter a year ago	7.0	12.5	-1.9	-15.3	-11.0	-10.6	1.9	-3.7	-13.4	29.7
% growth in output in the year to:										
2nd quarter 2006	4.2	18.0	-3.8	-31.6	-21.5	-4.0	-9.4	-0.3	-23.4	5.5

[1] large, i.e establishments with 10 or more employees

ANNEX

Quarterly Index of Industrial Production (QIIP) - Methodology

1 Introduction

The Index of Industrial Production shows the movement of the volume of output of the Industrial Sector. This index was calculated annually and published in the Digest of Industrial Statistics. Following the needs expressed by various institutions, both public and private, the Central Statistics Office decided to compile and disseminate the index on a quarterly basis. The compilation and dissemination of the Quarterly Index of Industrial Production is also one of the requirements of the **I**nternational **M**onetary **F**und (**IMF**) towards graduation to the **S**pecial **D**ata **D**issemination **S**tandard (**SDDS**).

2 Objectives

The **Q**uarterly **I**ndex of **I**ndustrial **P**roduction (**QIIP**) is one of the most important industrial short-term indicators which aim at measuring, on a quarterly basis, the ups and downs of the volume of industrial output with a special focus on detecting, as early as possible, the turning points of the business cycle. This enables planners, decision makers and the business community at large to be aware of any sign of change in the progress of the economy in order to take appropriate and timely policy measures.

At the office level, the index based on "hard" data, provides useful and reliable inputs for the improvement of the annual production estimates and forecasts as well as estimates of quarterly value added for the Industrial Sector.

3 Concept/Definition

The basic concept of the Index of Industrial Production is the measurement of the change in real value added at basic prices. Given that value added is defined as the difference between output and input, the compilation of the index, on a quarterly basis, is faced with practical difficulties in obtaining the data required on inputs and outputs within a reasonable period. In the absence of detailed data for most of the different industrial groups, an approximation of the index is based on change in deflated turnover, physical output or other indicators of change in real value added generated by industrial enterprises. The indicators used by main industrial grouping/sector are as follows:

Sector/Industrial grouping	Indicators used
Mining and quarrying	Value added deflated by appropriate deflators

Industry groups within manufacturing (excluding sugar milling)	Use of proxy indicators
	  i. Volume of production
	  ii. Employment
	  iii. Turnover data deflated by appropriate deflators (for most of the industry groups)
	  iv. Consumption of raw materials

Sugar milling	Value added deflated using the double deflation method. However, until final data

	are obtained quarterly changes are based on proportions of the deflated annual estimate/forecast. The proportions are computed from the latest quarterly cost structure of milling activities (see sections 7 and 8).
Electricity, gas and water supply	Volume of sales as proxy indicator.

The deflators used are the following price indices at detailed level, wherever possible:
  i. Producer Price Index (PPI)
  ii. Export Price Index (EPI)
  iii. Import Price Index (IPI)
  iv. Construction Price Index (CoPI)
  v. Consumers Price Index (CPI)
  vi. Wage Rate Index (WRI)

4   Scope/Classification

The Quarterly Index of Industrial Production covers the Industrial Sector, which comprises:

  Mining and quarrying (NSIC Section C),

  Manufacturing (NSIC Section D), and

  Electricity, Gas and Water Supply (NSIC Section E)

The activity classification used is the National Standard Industrial Classification of Economic Activities (NSIC) which is compatible to ISIC Rev. 3 recommended by the United Nations. As regards Manufacturing, the index is compiled separately for the EPZ and Non-EPZ sectors. However, for the Non-EPZ sector, because of the non-availability of basic data on small establishments, the index can be considered to refer to large establishments only.

5   Compilation practices

The weights have been derived (separately for EPZ and Non-EPZ within the manufacturing sector) from value added at basic prices by detailed industry group (mostly at 5-digit level of activity classification) compiled from the 2002 Census of Economic Activities. The index is calculated for each of the lowest level of activity classification and aggregation to the broader level is done as a weighted arithmetic average of the lowest level indices. The reference period for the calculation of the indices is 2002.

6   Data sources

As mentioned previously, use is extensively made of proxy indicators for the calculation of the index and one such indicator is deflated turnover data. Turnover data are mainly obtained from the VAT (Value Added Tax) Department, which is a very important source of secondary data. The sources of data by industry are as follows:

Sector/Industrial grouping	Data sources
Mining and quarrying	- Survey of establishments - Deflators used: PPI and WRI
Industry groups within manufacturing (excluding sugar milling)	Turnover data from VAT Department

	• Trade statistics • Quarterly Stock Survey • Quarterly Survey of Employment among EPZ and Pioneer enterprises • Sales of excisable goods from Customs Department • Deflators used: PPI, EPI and IPI
Sugar milling	• Data on income and expenditure from Mauritius Chamber of Agriculture • Deflators used: PPI, CoPI and CPI
Electricity, gas and water supply	Returns from CEB, CWA and Independent Power Producers (IPPs)

7 Problems/Constraints/Data quality

The practical difficulties in compiling an ideal index showing the evolution of value added at constant prices lead to the use of a number of approximation methods which are listed at section 3. Each of the methods has a number of constraints, the main ones being:

Deflated turnover:

- quality of data from VAT Department. The data refer to a mix of formal "large" responding enterprises/establishments. The output of secondary activities of an enterprise are included in turnover data corresponding to the main activity of the enterprise;

- time-lag between production and sales may lead to a late identification of a turning point in the business cycle;

- ignorance of changes in stocks gives a false picture of true production. However, based on available information from the Quarterly Stock Survey, adjustments are made, wherever possible, to take account of changes in stocks;

- the quality of the index is subject to the precision and relevance of the different price indices used for deflation.

- assumption based on a fixed ratio of value added to gross output when, in fact, the ratio may change as a result of technological changes, productivity changes as well as seasonal variation in the production structure

Consumption of raw materials:
- involves the assumption that output is constant per unit of materials used.

Employment:

- does not take account of changes in labour productivity. Although, in the short term, it is reasonable to assume that labour productivity is relatively constant, this is not true in the long term;

Volume of production:
- does not take account of quality changes

For sugar milling, final quarterly real value added is computed from final annual accounts which are available with a lag of two years. Until then, the deflated annual estimate/forecast of sugar production and the latest quarterly cost structure of sugar milling activities are used

to compute the quarterly estimates. These may be subject to large revisions when final data are obtained with a lag of two years.

8   Appropriateness of the QIIP

In spite of the above constraints/weaknesses, it is observed that the index shows relative consistency and is of reliable quality for the measurement of quarterly and other changes. However, great care should be taken when interpreting small changes that may be insignificant at the more detailed level.

Users are also cautioned in the use of the overall index which includes "Sugar Milling". For the latest two years, the overall index is affected by the preliminary methodology used for estimating quarterly changes in "Sugar Milling" which is based on fixed proportions of the deflated annual estimate/forecast (see section 7). Moreover, because of climatic conditions, the forecasted annual figure itself is subject to large deviations.

9   Index calculation

The QIIP is calculated according to a modified Laspeyre's index and the formula is:

$$I_t = \frac{\sum W_i (Q_{it}/Q_{io})}{\sum W_i} \times 100$$

with I_t = index for quarter t
        W_i = weight for activity i

   (Q_{it}/Q_{io}) = is the growth in real value added of activity i in quarter t
                relative to the base year as estimated by an appropriate proxy
                indicator