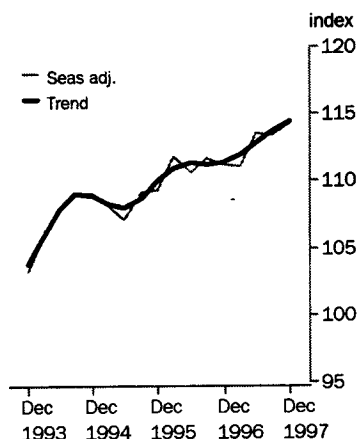# Australian Bureau of Statistics

INDEXES OF INDUSTRIAL PRODUCTION

AUSTRALIA

EMBARGO: 11:30AM (CANBERRA TIME) WED 11 MAR 1998

Total Industrial production

index

— Seas adj.
— Trend

Dec 1993   Dec 1994   Dec 1995   Dec 1996   Dec 1997

DECEMBER QTR KEY FIGURES(a)

TREND ESTIMATES	% change Sep Qtr 97 to Dec Qtr 97	% change Dec Qtr 96 to Dec Qtr 97
Gross product at constant prices		
Mining(b)	2.5	6.7
Manufacturing	–0.1	1.2
Electricity, gas and water	1.1	3.9
Total industrial	**0.6**	**2.7**

• •

SEASONALLY ADJUSTED	% change Sep Qtr 97 to Dec Qtr 97	% change Dec Qtr 96 to Dec Qtr 97
Gross product at constant prices		
Mining(b)	3.3	5.3
Manufacturing	–0.6	1.2
Electricity, gas and water	3.4	5.4
Total industrial	**0.8**	**2.6**

(a) At average 1989–90 prices   (b) Excludes services to mining

DECEMBER QTR KEY POINTS

TREND ESTIMATES

- Industrial production levels have risen steadily since September quarter 1995 except for the second half of 1996 when production levels remained static. Total industrial production was 2.7% higher than a year earlier and 4.0% higher than two years earlier. Strongest growth was by the Mining industry.

- In the December quarter 1997, industrial production rose by 0.6% overall but mixed results came fom the major industries. Production by Mining and by Electricity, gas and water industries grew but manufacturing production fell slightly.

- Production levels fell in five of the nine manufacturing subdivisions. The largest fall was by Metal product manufacturing (-2.6%). The largest rise was by Printing, publishing and recorded media (3.5%).

SEASONALLY ADJUSTED ESTIMATES

- Industrial production grew by 0.8% in December quarter 1997. Strong growth by Mining and by Electricity, gas and water industries was largely offset by a fall in the Manufacturing industry.

INQUIRIES

- For further information about these and related statistics, contact Harvey Bissett on 02 6252 5639, or any ABS Office.

N O T E S

CHANGES IN THIS ISSUE

This is the final issue of Indexes of industrial production. However, data will continue to be available in index form in *Australian Economic Indicators (Cat no 1350.0)*. Source data from which the indexes are compiled will continue to be published in tables 54 to 56 of *National income, expenditure and product (Cat no 5206.0)*

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W. McLennan
Australian Statistician

INDUSTRIAL PRODUCTION: Gross product(a)

## INDEX NUMBERS: BASE OF INDEX 1989-90 = 100.0

MINING

The Mining industry trend estimate continues the strong growth of recent quarters. The rise of 2.5% in the trend production estimate has brought production levels to the highest recorded since the series began in 1976. Production has grown by 6.7% since December quarter 1996 and by 10.4% since December quarter 1995.
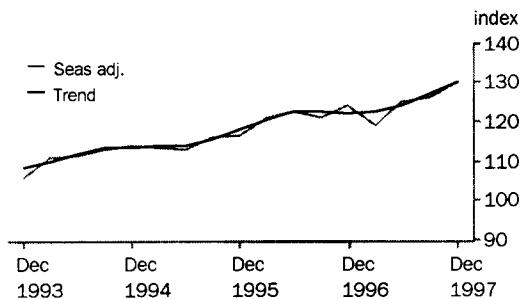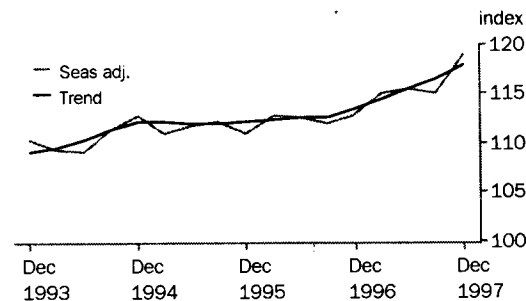

MANUFACTURING

The trend estimate for the Manufacturing industry shows a slight fall in production for December quarter 1997. Over the past ten quarters, manufacturing production has generally risen slowly with an occasional small fall. Production in this industry has grown by 1.2% since December quarter 1996 and by 1.9% since December quarter 1995.
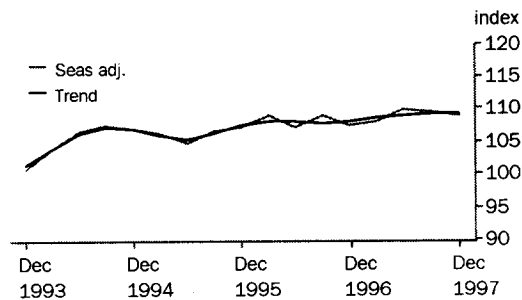
ELECTRICITY, GAS AND WATER

The December quarter trend estimate growth of 1.1% continues a period of growth which began in December quarter 1995. Production in this industry has grown by 3.9% since December quarter 1996 and by 5.0% since December quarter 1995.
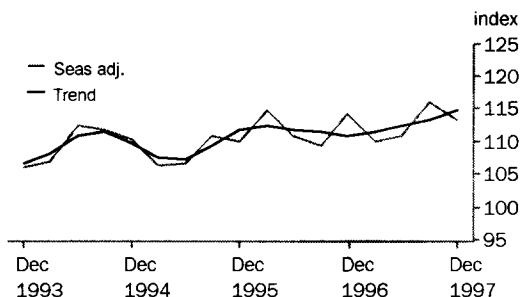

(a) At average 1989-90 prices

MANUFACTURING: Gross product(a)

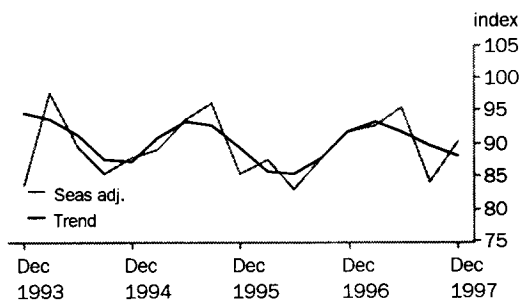## INDEX NUMBERS: BASE OF INDEX 1989-90 = 100.0

FOOD, BEVERAGE AND TOBACCO

The rise of 1.2% in the trend production estimate was the fourth successive rise following three quarters of falls. Production in this industry has grown by 3.4% since December quarter 1996 and by 2.7% since December quarter 1995.

index
— Seas adj.
— Trend

125
120
115
110
105
100
95

| Dec 1993 | Dec 1994 | Dec 1995 | Dec 1996 | Dec 1997 |

TEXTILE, CLOTHING, FOOTWEAR AND LEATHER

The fall of 1.7% in the trend production estimate was the third successive fall and the seventh quarterly fall in the past three years. Production in this industry has fallen by 3.8% since December quarter 1996 and by 1.5% since December quarter 1995.

index

105
100
95
90
85
— Seas adj.
— Trend
80
75

| Dec 1993 | Dec 1994 | Dec 1995 | Dec 1996 | Dec 1997 |

WOOD AND PAPER PRODUCT

The fall of 0.9% in the trend production estimate followed a smaller fall in the previous quarter which followed several quarters of growth. Production in this industry has grown by 4.5% since December quarter 1996 and by 11.0% since December quarter 1995.
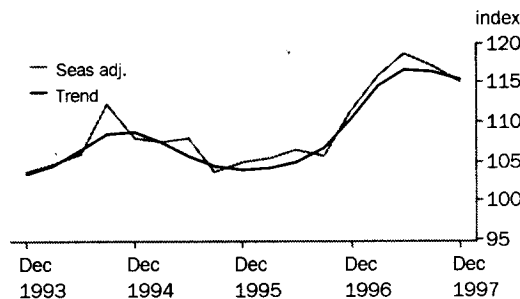
index
120
— Seas adj.
— Trend
115
110
105
100
95

| Dec 1993 | Dec 1994 | Dec 1995 | Dec 1996 | Dec 1997 |

(a) At average 1989-90 prices

INDEX NUMBERS: BASE OF INDEX 1989-90 = 100.0

PRINTING, PUBLISHING AND RECORDED MEDIA

The rise of 3.6% in the trend production estimate is the fourth successive rise. These rises have been sufficiently strong to overcome earlier falls and to bring production levels to the highest recorded since the series began in 1976. Production in this industry has grown by 14.1% since December quarter 1996 and by 9.3% since December quarter 1995.
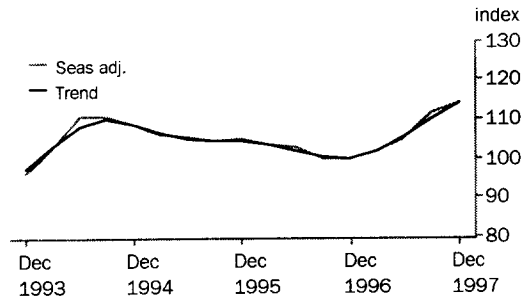
PETROLEUM, COAL, CHEMICAL AND ASSOCIATED PRODUCT

The rise of 1.4% in the trend production estimate is the fourth successive rise and has brought production levels to the highest recorded since the series began in 1976. Production in this industry has grown by 6.3% since December quarter 1996 and by 6.8% since December quarter 1995.
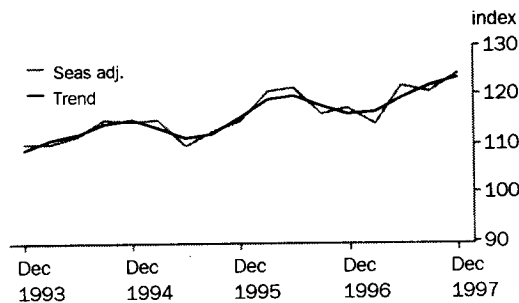
NON-METALLIC MINERAL PRODUCT

The fall of 1.7% in the trend production estimate is the third successive fall. Production has fallen in ten of the past twelve quarters. Production has fallen to its lowest level since December quarter 1991. Production in this industry has fallen by 1.5% since December quarter 1996 and by 7.1% since December quarter 1995.

(a) At average 1989-90 prices

INDEX NUMBERS: BASE OF INDEX 1989-90 = 100.0

METAL PRODUCT

The fall of 2.6% in the trend production estimate is the sixth successive fall. Production has fallen to its lowest level since March quarter 1988. Production in this industry has fallen by 11.1% since December quarter 1996 and by 12.1% since December quarter 1995.

```
                                              index
                                             ┌120
        — Seas adj.                          ├115
        — Trend                              ├110
                                             ├105
                                             ├100
                                             ├95
                                             └90
        Dec      Dec      Dec      Dec      Dec
        1993     1994     1995     1996     1997
```
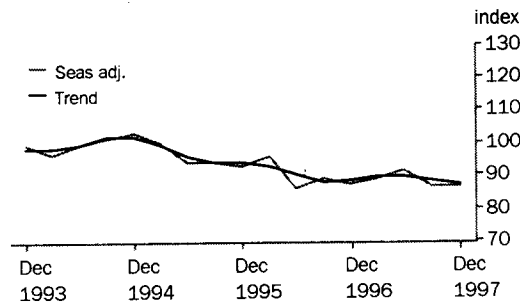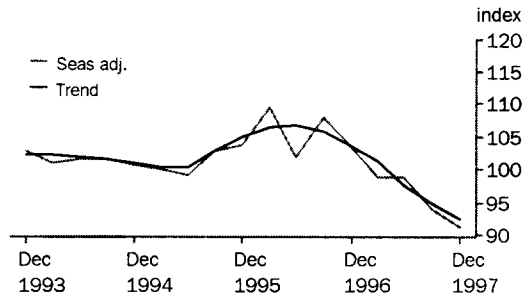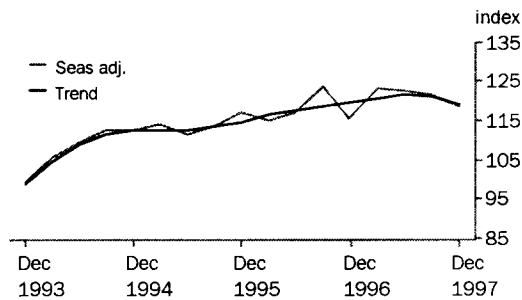
MACHINERY AND EQUIPMENT

The fall of 1.5% in the trend production estimate is the second successive fall which followed nine successive quarterly rises. Production has fallen by 0.5% since December quarter 1996 but risen by 4.2% since December quarter 1995.

```
                                              index
                                             ┌135
        — Seas adj.                          ├125
        — Trend                              ├115
                                             ├105
                                             ├95
                                             └85
        Dec      Dec      Dec      Dec      Dec
        1993     1994     1995     1996     1997
```

OTHER MANUFACTURING

The rise of 2.8% in the trend production estimate is the seventh successive rise. Production has risen by 12.0% since December quarter 1996 and by 12.7% since December quarter 1995.

```
                                              index
                                             ┌130
        — Seas adj.                          ├120
        — Trend                              ├110
                                             ├100
                                             ├90
                                             ├80
                                             └70
        Dec      Dec      Dec      Dec      Dec
        1993     1994     1995     1996     1997
```
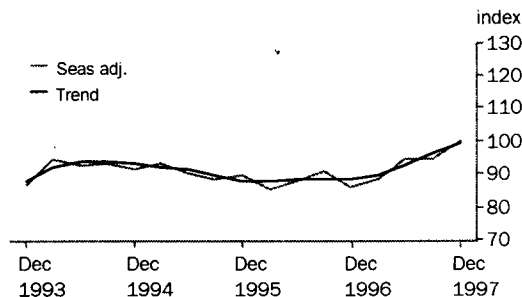
(a) At average 1989-90 prices

TOTAL INDUSTRIAL GROSS PRODUCT(a), Index Numbers(b)

Quarters	Mining (excluding services to mining)	Total manufacturing	Electricity, gas and water	Total industrial
ORIGINAL				
1994-95				
December	112.0	111.7	111.9	111.8
March	110.2	100.2	109.2	103.4
June	113.5	103.4	110.9	106.3
1995-96				
September	121.3	108.7	116.3	112.1
December	114.3	111.9	109.9	112.0
March	117.4	103.4	111.0	107.0
June	123.6	105.6	111.6	109.7
1996-97				
September	126.6	111.2	116.0	114.7
December	121.5	112.5	111.7	114.0
March	115.9	102.3	113.2	106.4
June	125.9	108.4	114.5	112.5
1997-98				
September	131.9	111.6	119.1	116.4
December	127.9	113.9	117.6	117.0
SEASONALLY ADJUSTED				
1994-95				
December	113.8	106.9	112.9	109.0
March	113.6	106.1	111.0	108.2
June	113.0	104.6	111.9	107.2
1995-96				
September	116.2	106.6	112.3	109.2
December	116.4	107.0	111.1	109.3
March	120.9	109.1	112.9	111.8
June	122.9	107.0	112.6	110.7
1996-97				
September	121.2	109.0	112.0	111.6
December	124.0	107.6	112.8	111.3
March	119.2	108.1	115.0	111.1
June	125.2	109.9	115.6	113.5
1997-98				
September	126.4	109.5	115.0	113.4
December	130.5	108.9	118.9	114.3
TREND ESTIMATES				
1994-95				
December	113.6	106.8	112.2	108.9
March	113.9	105.9	112.3	108.3
June	114.2	105.4	112.0	108.0
1995-96				
September	115.5	106.2	112.0	108.7
December	118.1	107.3	112.3	110.0
March	120.6	108.0	112.5	110.9
June	122.5	108.1	112.6	111.4
1996-97				
September	122.8	107.9	112.7	111.3
December	122.2	108.0	113.5	111.4
March	122.4	108.6	114.5	111.9
June	124.3	109.1	115.5	112.8
1997-98				
September	127.2	109.4	116.6	113.7
December	130.4	109.3	117.9	114.4

(a) At average 1989–90 prices

(b) Base of index 1989–90=100.0

Quarters	Mining (excluding services to mining)	Total manufacturing	Electricity, gas and water	Total industrial
ORIGINAL				
1994-95				
December	-5.0	2.0	-3.1	-0.1
March	-1.6	-10.3	-2.4	-7.5
June	3.0	3.1	1.6	2.9
1995-96				
September	6.9	5.2	4.9	5.5
December	-5.8	2.9	-5.5	-0.1
March	2.7	-7.6	1.0	-4.4
June	5.3	2.1	0.5	2.5
1996-97				
September	2.4	5.3	3.9	4.5
December	-4.0	1.2	-3.7	-0.6
March	-4.7	-9.0	1.4	-6.7
June	8.6	5.9	1.1	5.7
1997-98				
September	4.8	3.0	4.0	3.5
December	-3.1	2.0	-1.3	0.5
SEASONALLY ADJUSTED				
1994-95				
December	0.8	-0.7	1.3	-0.1
March	-0.2	-0.8	-1.7	-0.8
June	-0.5	-1.3	0.8	-0.9
1995-96				
September	2.8	1.9	0.3	1.8
December	0.2	0.4	-1.0	0.2
March	3.8	1.9	1.6	2.3
June	1.7	-2.0	-0.2	-1.0
1996-97				
September	-1.4	1.9	-0.6	0.9
December	2.3	-1.3	0.7	-0.3
March	-3.8	0.5	1.9	-0.2
June	5.0	1.6	0.5	2.1
1997-98				
September	1.0	-0.3	-0.5	-0.1
December	3.3	-0.6	3.4	0.8
TREND ESTIMATES				
1994-95				
December	0.3	-0.4	0.7	-0.1
March	0.2	-0.9	0.1	-0.5
June	0.3	-0.4	-0.3	-0.3
1995-96				
September	1.1	0.7	0.0	0.7
December	2.2	1.0	0.3	1.1
March	2.1	0.7	0.2	0.9
June	1.6	0.1	0.1	0.4
1996-97				
September	0.3	-0.2	0.1	0.0
December	-0.5	0.0	0.7	0.0
March	0.2	0.5	0.9	0.5
June	1.6	0.5	0.9	0.7
1997-98				
September	2.3	0.3	0.9	0.8
December	2.5	-0.1	1.1	0.6

(a) At average 1989–90 prices

MANUFACTURING GROSS PRODUCT(a), By ANZSIC Subdivision–Index Numbers(b)

Quarters	Food, beverage and tobacco mfg	Textile, clothing, footwear and leather mfg	Wood and paper product mfg	Printing, publishing and recorded media	Petroleum, coal, chemical and assoc. product mfg	Non-metallic mineral product mfg	Metal product mfg	Machinery and equipment mfg	Other manufacturing	Total manufacturing
					ORIGINAL					
1994-95										
December	118.8	88.5	114.4	115.1	116.3	105.5	103.4	117.5	98.0	111.7
March	101.8	86.9	101.6	96.6	111.8	95.0	94.3	107.3	83.7	100.2
June	102.2	92.3	105.2	106.4	109.9	92.4	98.7	111.7	88.2	103.4
1995-96										
September	111.7	98.6	105.7	106.7	113.5	97.2	106.3	115.4	93.9	108.7
December	118.6	85.9	111.3	110.0	116.1	94.7	106.8	122.1	95.5	111.9
March	110.2	85.6	99.3	96.2	117.1	91.1	102.7	108.7	76.3	103.4
June	105.9	82.0	104.2	104.1	122.0	84.6	101.1	117.0	85.5	105.6
1996-97										
September	110.7	90.1	107.6	101.7	117.4	92.4	112.2	125.1	96.4	111.2
December	123.0	92.0	118.2	104.7	119.0	89.2	106.9	120.7	91.7	112.5
March	105.5	91.1	109.1	93.5	110.9	85.0	92.6	116.5	78.8	102.3
June	105.4	94.0	116.3	106.4	122.4	89.8	98.2	122.4	92.4	108.4
1997-98										
September	117.9	86.3	118.9	112.3	122.0	89.9	97.5	123.3	100.8	111.6
December	122.1	90.4	122.1	120.5	125.9	88.6	94.0	124.2	106.5	113.9
					SEASONALLY ADJUSTED					
1994-95										
December	110.4	87.8	108.0	108.5	114.6	103.1	100.6	112.8	91.4	106.9
March	106.2	89.2	107.6	106.0	115.1	100.0	100.2	114.1	93.5	106.1
June	106.6	93.7	108.1	105.7	109.4	93.8	99.2	111.7	90.3	104.6
1995-96										
September	111.0	96.1	103.7	104.3	112.3	93.6	102.8	113.8	88.5	106.6
December	110.0	85.5	104.9	104.9	114.4	92.6	103.8	117.0	89.6	107.0
March	115.0	87.5	105.4	103.7	120.5	95.6	109.5	115.1	85.2	109.1
June	111.0	83.1	106.6	102.8	121.6	86.1	101.8	117.2	87.5	107.0
1996-97										
September	109.4	87.9	105.8	100.1	116.1	89.1	108.2	123.7	90.6	109.0
December	114.2	91.8	111.4	99.9	117.3	87.1	103.8	115.5	86.1	107.6
March	110.1	92.8	115.8	101.9	114.1	89.0	98.9	123.3	88.3	108.1
June	110.8	95.4	118.7	104.9	121.9	91.6	98.8	122.7	94.5	109.9
1997-98										
September	116.2	84.1	117.3	111.4	120.7	86.6	93.9	121.9	94.5	109.5
December	113.3	90.3	115.1	114.3	124.2	86.5	91.3	118.8	100.0	108.9
					TREND ESTIMATES					
1994-95										
December	109.6	87.2	108.7	108.7	114.7	102.1	101.0	112.7	93.0	106.8
March	107.5	90.8	107.4	106.4	113.2	99.6	100.3	112.5	92.3	105.9
June	107.3	93.4	105.6	105.1	111.4	95.9	100.5	112.6	91.3	105.4
1995-96										
September	109.3	92.9	104.5	104.6	111.9	94.1	102.8	113.6	89.8	106.2
December	111.8	89.5	104.0	104.3	115.4	93.6	105.1	114.5	88.0	107.3
March	112.3	85.8	104.2	103.5	119.0	92.4	106.4	116.4	87.7	108.0
June	111.9	85.4	105.0	102.0	119.8	89.9	106.7	117.7	88.1	108.1
1996-97										
September	111.5	87.9	106.8	100.4	117.8	88.0	105.8	118.8	88.2	107.9
December	111.0	91.7	110.4	99.9	116.0	88.3	103.9	119.9	88.6	108.0
March	111.5	93.5	114.6	101.7	116.7	89.7	101.3	120.9	89.8	108.6
June	112.3	91.9	116.6	105.6	119.2	89.5	97.7	121.5	92.9	109.1
1997-98										
September	113.5	89.7	116.4	110.1	121.7	88.5	94.8	121.1	96.5	109.4
December	114.8	88.2	115.4	114.0	123.3	87.0	92.4	119.3	99.2	109.3

(a) At average 1989–90 prices

(b) Base of index 1989–90=100.0

4

MANUFACTURING GROSS PRODUCT(a), By ANZSIC Subdivision–Percentage Changes

Quarters	Food, beverage and tobacco mfg	Textile, clothing, footwear and leather mfg	Wood and paper product mfg	Printing, publishing and recorded media	Petroleum, coal, chemical and assoc. product mfg	Non-metallic mineral product mfg	Metal product mfg	Machinery and equipment mfg	Other manufacturing	Total manufacturing
ORIGINAL										
1994-95										
December	5.9	0.6	-0.4	2.4	0.1	0.5	-1.3	2.8	-0.4	2.0
March	-14.3	-1.8	-11.2	-16.0	-3.9	-10.0	-8.8	-8.7	-14.7	-10.3
June	0.4	6.2	3.6	10.1	-1.7	-2.8	4.6	4.1	5.4	3.1
1995-96										
September	9.3	6.8	0.5	0.3	3.3	5.2	7.8	3.3	6.5	5.2
December	6.2	-12.9	5.3	3.1	2.3	-2.5	0.5	5.8	1.8	2.9
March	-7.1	-0.3	-10.8	-12.6	0.9	-3.8	-3.9	-11.0	-20.1	-7.6
June	-3.9	-4.3	5.0	8.2	4.2	-7.1	-1.6	7.7	12.1	2.1
1996-97										
September⁻	4.6	9.9	3.3	-2.3	-3.8	9.2	11.0	6.9	12.7	5.3
December	11.1	2.1	9.8	3.0	1.4	-3.5	-4.8	-3.5	-4.8	1.2
March	-14.2	-1.0	-7.7	-10.8	-6.8	-4.7	-13.3	-3.4	-14.1	-9.0
June	0.0	3.1	6.6	13.9	10.4	5.7	6.0	5.0	17.3	5.9
1997-98										
September	11.8	-8.2	2.2	5.5	-0.4	0.1	-0.6	0.7	9.0	3.0
December	3.5	4.8	2.7	7.3	3.2	-1.5	-3.6	0.8	5.7	2.0
SEASONALLY ADJUSTED										
1994-95										
December	-1.3	2.8	-3.9	-1.9	-0.4	2.0	-0.9	-0.2	-2.1	-0.7
March	-3.8	1.6	-0.4	-2.3	0.4	-3.0	-0.4	1.2	2.3	-0.8
June	0.4	5.0	0.4	-0.3	-5.0	-6.2	-1.0	-2.1	-3.4	-1.3
1995-96										
September	4.1	2.5	-4.1	-1.3	2.7	-0.2	3.7	1.9	-1.9	1.9
December	-0.8	-11.0	1.2	0.6	1.9	-1.1	0.9	2.8	1.2	0.4
March	4.5	2.4	0.4	-1.2	5.3	3.3	5.5	-1.6	-4.9	1.9
June	-3.5	-5.0	1.2	-0.8	0.9	-9.9	-7.1	1.8	2.6	-2.0
1996-97										
September	-1.4	5.7	-0.7	-2.7	-4.5	3.5	6.4	5.5	3.7	1.9
December	4.3	4.4	5.3	-0.2	1.0	-2.3	-4.0	-6.6	-5.0	-1.3
March	-3.6	1.1	4.0	2.0	-2.8	2.2	-4.7	6.7	2.6	0.5
June	0.7	2.8	2.5	3.0	6.9	2.9	-0.1	-0.5	7.0	1.6
1997-98										
September	4.9	-11.8	-1.2	6.2	-1.0	-5.4	-5.0	-0.7	0.0	-0.3
December	-2.5	7.3	-1.9	2.6	2.9	-0.1	-2.7	-2.5	5.8	-0.6
TREND ESTIMATES										
1994-95										
December	-1.8	-0.5	0.3	-1.3	0.5	0.5	-0.6	0.9	-0.8	-0.4
March	-1.9	4.2	-1.2	-2.1	-1.3	-2.5	-0.6	-0.2	-0.7	-0.9
June	-0.2	2.9	-1.7	-1.2	-1.6	-3.8	0.2	0.1	-1.1	-0.4
1995-96										
September	1.9	-0.5	-1.1	-0.5	0.4	-1.9	2.3	0.8	-1.6	0.7
December	2.3	-3.7	-0.5	-0.3	3.1	-0.6	2.2	0.8	-1.9	1.0
March	0.4	-4.1	0.2	-0.7	3.1	-1.3	1.2	1.6	-0.3	0.7
June	-0.4	-0.5	0.8	-1.5	0.7	-2.6	0.2	1.1	0.4	0.1
1996-97										
September	-0.3	2.9	1.6	-1.6	-1.7	-2.2	-0.8	0.9	0.1	-0.2
December	-0.5	4.3	3.4	-0.5	-1.5	0.4	-1.8	0.9	0.5	0.0
March	0.5	2.0	3.8	1.7	0.6	1.6	-2.6	0.9	1.3	0.5
June	0.7	-1.7	1.8	3.9	2.2	-0.2	-3.6	0.5	3.5	0.5
1997-98										
September	1.0	-2.4	-0.2	4.2	2.0	-1.2	-2.9	-0.3	3.9	0.3
December	1.2	-1.7	-0.9	3.6	1.4	-1.7	-2.6	-1.5	2.8	-0.1

(a) At average 1989–90 prices

EXPLANATORY NOTES

INTRODUCTION

1 This publication presents in index number form, quarterly estimates of gross product at constant average 1989–90 prices for the non-farm, goods producing sector which, for brevity, is termed the 'total industrial' (see paragraph 3).

2 Also presented are indexes for component industries, including individual manufacturing subdivisions.

SCOPE AND COVERAGE

3 The scope of 'total industrial' referred to in this publication is defined to include all establishments classified to the Australian and New Zealand Standard Industrial Classification (ANZSIC) Division B (Mining), excluding ANZSIC subdivision 15 (Services to mining); Division C (Manufacturing); and Division D (Electricity, gas and water).

4 The base year weights used in constructing the indexes in this publication have been derived from establishment data. However, the quarterly indicator series used for manufacturing are based on data relating to business units which may cover more than one establishment.

5 The table below sets out the base year weights associated with the major components of the industrial sector, and each manufacturing subdivision.

	1989–90 Weight %
Mining (excluding services to mining)	18.0
Manufacturing	67.5
Food, beverage and tobacco mfg	13.7
Textiles, clothing, footwear and leather mfg	3.7
Wood and paper product mfg	3.5
Printing, publishing and recorded media	6.4
Petroleum, coal, chemical and associated product mfg	6.5
Non-metallic mineral product mfg	3.4
Metal product mfg	11.4
Machinery and equipment mfg	15.6
Other manufacturing	3.3
Electricity, gas and water	14.5
Total Industrial sector	100.0

6 Quarterly manufacturers' sales and stocks data provides the main indicator series for the manufacturing indexes. As a result, these indexes have three important limitations as measures of manufacturing production:

- changes in quarterly production by manufacturing establishments of non-manufacturing businesses are not reflected in the indexes;
- changes in a part of the quarterly production of non-manufacturing establishments of manufacturing businesses are reflected in the indexes; and
- changes in quarterly production by government bodies such as shipyards are not reflected in the indexes.

7 The scope of the data used in the manufacturing indicator series also differs slightly from the general definition of manufacturing gross product. The stocks estimates used include finished goods bought in, but not manufactured, by a business. As far as can be assessed this has not had a significant influence on the estimates.

EXPLANATORY NOTES

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DERIVATION OF THE ESTIMATES OF
GROSS PRODUCT

8 The estimates are derived using the gross output method whereby base year (1989–90) estimates of gross product are extrapolated by constant price estimates of gross output. All the quarterly indexes contained in this publication have been benchmarked, where possible, to annual estimates (see paragraph 12 below).

9 For further details on the derivation of constant price gross product for individual industries refer to Chapter 18 in *Australian National Accounts : Concepts, Sources and Methods* (5216.0).

BENCHMARKING

10 Deriving quarterly estimates presents special problems in that it is often difficult to adhere strictly to the definitions and concepts used in annual estimates. Frequently, it is not possible to use the same data sources as used for annual estimates, and alternative quarterly data sources are generally much less detailed.

11 For example, annual estimates of gross product for the Mining industry (as published in *Australian National Accounts : National Income, Expenditure and Product* (5204.0)) are compiled (using the double deflation method) from detailed output and input data from the annual census of mining establishments. On the other hand, the quarterly series draw on the quantities of minerals mined (gross output), reported in surveys of mining establishments.

12 In such cases, where the quarterly estimates are inferior to the annual, the quarterly estimates are adjusted to agree with the annual estimates in such a way that preserves, as far as practical, the movements of the quarterly series. This is commonly referred to as benchmarking.

DATA SOURCES FOR QUARTERLY
OUTPUT SERIES

MINING (EXCLUDING
SERVICES TO MINING)

13 Quarterly constant price output estimates are derived for major ANZSIC classes by quantity revaluation (i.e. quantities produced each quarter multiplied by associated base year (1989–90) average prices). Estimates of quantities produced are obtained from data contained in Quarterly Mineral Statistics (Australian Bureau of Agricultural and Resource Economics) and *The Australian Mining Industry* (8414.0).

14 Constant price estimates of value added are derived by the gross output method (see paragraph 8) for each ANZSIC class. Total quarterly estimates of value added are then benchmarked (see paragraph 12) to annual gross product estimates obtained from the mining census.

MANUFACTURING

15 Quarterly constant price estimates of gross output for each manufacturing industry subdivision (excluding petroleum refining) are derived by summing constant price estimates of manufacturers' sales of manufactured goods, other operating revenue (where significant) and changes in the level of stocks of finished goods and work-in-progress.

16 Constant price estimates of all components of manufacturing output except petroleum refining are derived by price deflation, i.e. current price components (obtained from the quarterly Survey of Stocks and Manufacturers' Sales) are deflated by fixed weighted producer price indexes (published in *Price Indexes of Articles Produced by Manufacturing Industry, Australia* (6412.0)).

17 Quarterly petroleum refining estimates are based on quarterly quantity data published in *Major Energy Statistics* (released by the Department of Primary Industries and Energy).

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EXPLANATORY NOTES

MANUFACTURING *continued* **18** Quarterly constant price estimates of output are used to derive constant price estimates of gross product at factor cost by the gross output method. The latter estimates are then benchmarked to corresponding annual estimates of gross product at market prices (based on annual Manufacturing Survey data).

ELECTRICITY **19** Quarterly quantities of electricity produced, as published in *Manufacturing Production, Australia* (8301.0), are benchmarked to annual gross product estimates based on the quantity of electricity sold (published by the Electricity Supply Association of Australia in *The Electricity Industry of Australia*).

GAS **20** Quarterly quantities of gas available through mains, as published in *Manufacturing Production, Australia* (8301.0), are benchmarked to gross product estimates derived from ABS economic census data relating to the performance of the gas production and distribution industry.

WATER AND SEWERAGE **21** Quarterly constant price output estimates are derived by quantity revaluation, i.e. quantities of water sold (to final consumers and for irrigation) and sewerage connections, are multiplied by average 1989–90 prices for each type of service.

22 The quantity data are supplied by a selection of State and Local government authorities. Quarterly output estimates are then benchmarked to annual constant price gross product estimates.

SAMPLE REVISION **23** Each year the sample used for the survey of stocks and manufacturers' sales is revised. Differences between the old and revised samples have in general been apportioned back over the preceeding quarters of each year, and incorporated in the estimates included in this publication.

24 For more information on the sample revision, refer to *Stocks and sales, selected industries, Australia* (5629.0).

RELIABILITY OF ESTIMATES **25** Because the measures used in the derivation of the manufacturing indexes are based on a sample survey, the indexes themselves are subject to sampling variability.

26 In terms of original estimates the standard errors in percentage terms approximate the errors reported in *Stocks and sales, selected industries, Australia* (5629.0). However, for constant price estimates the standard errors may be up to 10 per cent higher than those for the corresponding current price estimates because of the sampling variability contained in the prices data used to deflate the current price estimates. Seasonally adjusting the estimates has an insignificant effect on standard errors.

27 The imprecision due to sampling variability, which is measured by the standard error, should not be confused with inaccuracies that may occur because of imperfections in reporting by respondents and errors made in collecting and processing data. Inaccuracies of this kind are known as non-sampling errors and may occur in any collection, whether it be a sample or a full count.

28 In addition to the non-sampling errors which may occur in current prices estimates, there may be non-sampling errors introduced by the process of compiling constant price estimates. These further errors may arise from the introduction of additional data and from the assumptions and approximations which are necessary in compiling constant price estimates.

29 Every effort is made to minimise non-sampling errors by careful design of forms, editing of data and efficient operating procedures.

EXPLANATORY NOTES

SEASONAL ADJUSTMENT

30 Seasonal adjustment is a means of removing the estimated effects of normal seasonal variation from the series so that the effects of other influences on the series may be more clearly recognized.

31 Seasonal adjustment procedures do not aim to remove the irregular or non-seasonal influences which may be present in any particular quarter, such as the effect of a major industrial dispute or major plant breakdowns.

32 Irregular factors of this nature can make it difficult to interpret the movement of the series even after adjustment for seasonal variation.

33 Seasonal adjustment may be carried out by various methods and the results may vary slightly according to the procedure adopted. Accordingly, seasonally adjusted statistics should not be regarded as in any way definitive.

34 In interpreting particular seasonally adjusted statistics it is important to note the methods by which they have been derived and the limitations to which the methods used are subject. Details of the various seasonal adjustment methods used are available on request.

TREND ESTIMATES

35 The seasonally adjusted series can be smoothed to reduce the impact of the irregular component in the adjusted series. There are a number of ways of accomplishing this, depending on the intended uses of the smoothed series.

36 If importance is attached to measuring the underlying change in the most recent periods, moving averages employing appropriate weighting patterns should be adopted; the choice of averaging technique will determine the degree of smoothness of the derived series.

37 For example, a 9–term moving average will even out more of the short term fluctuation in a series (and therefore appear 'smoother') than will a 5–term moving average. However, the longer the term of the moving average the longer the series affected by revisions resulting from more recent data becoming available.

38 Such smoothed seasonally adjusted estimates are referred to as 'trend estimates' in this publication.

39 Trend estimates included in this issue are derived using a 7–term Henderson moving average. (The weights of the 7–term average are available upon request.) As a moving average approaches the end of a time series and begins to run out of observations, asymmetric averages have been used. Unlike the asymmetric weights of the standard 7–term Henderson moving averages, the weights employed here have been tailored to suit the particular characteristics of individual manufacturing subdivisions.

40 Users may wish to refer to the ABS Information Paper *A Guide to Interpreting Time Series–Monitoring 'Trends': An Overview* (1348.0) for more detailed information on smoothing seasonally adjusted time series data.

EXPLANATORY NOTES

RELATED PUBLICATIONS

41 Users may also wish to refer to the following publications:

- *Australian National Accounts : National Income, Expenditure and Product* (5204.0)—issued annually
- *Australian National Accounts : National Income, Expenditure and Product* (5206.0)—issued quarterly
- *Australian National Accounts : Concepts, Sources and Methods* (5216.0)
- *Manufacturing Industry, Australia* (8221.0)—issued annually
- *The Australian Mining Industry* (8414.0)—issued annually
- *Price Indexes of Articles Produced by Manufacturing Industry, Australia* (6412.0)—issued monthly
- *Manufacturing Production, Australia* (8301.0)—issued monthly
- *Stocks and Sales, Selected Industries, Australia* (5629.0)—issued quarterly.

42 Current publications produced by the ABS are listed in the *Catalogue of Publications and Products, Australia* (1101.0). The ABS also issues on Tuesdays and Fridays, a *Release Advice* (1105.0) which lists publications to be released in the next few days. The Catalogue and Release Advice are available from any ABS office.

SYMBOLS AND OTHER USAGES

ANZSIC   Australian and New Zealand Standard Industrial Classification

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