

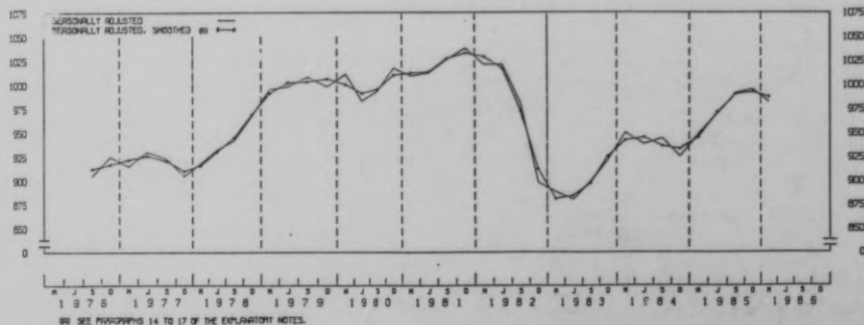


### QUARTERLY INDEXES OF MANUFACTURING PRODUCTION, AUSTRALIA MARCH QUARTER 1986

- PHONE INQUIRIES**
- *about these statistics*—contact Paul Curran on Canberra (062) 52 6708 or any ABS State office.
  - *about other statistics and ABS services*— contact Information Services on Canberra (062) 52 6627 or any ABS State office.
- MAIL INQUIRIES**
- *write to Information Services, ABS, P.O. Box 10, Belconnen, A.C.T. 2616* or any ABS State office.
- ON VIATEL**
- key \*656# for selected economic, social and demographic statistics on VIATEL.

#### MAIN FEATURES

INDEX OF TOTAL MANUFACTURING GROSS PRODUCT AT AVERAGE 1979-80 PRICES  
(BASE: 1979-80 = 1000)



*Note: The following comments are based on seasonally adjusted, constant price data unless otherwise stated.*

Preliminary estimates show that the index of total manufacturing production fell by 1.3 per cent in March quarter 1986 to a level 3.6 per cent higher than that recorded in March quarter 1985. The industries most responsible for the overall decline were Textiles, clothing and footwear (down 10.8 per cent), Basic metal products (down 4.3 per cent) and Transport equipment (down 7.2 per cent). (It is likely that the last overstates the actual fall because no information is incorporated for the public sector, which includes railway workshops and some aircraft maintenance facilities which are unlikely to have experienced falls in activity similar to those in motor vehicle production). The industries in which production

increased during the quarter were Food, beverages and tobacco (2.1 per cent), Chemicals, petroleum and coal products (2.5 per cent) and Fabricated metal products (3.1 per cent).

*Note: While the indexes of manufacturing production are based on data published in 'Stocks Owned by Private Enterprises in Selected Industries and Sales of Goods Manufactured by Private Manufacturing Enterprises, Australia' (5629.0), movements in the indexes will not necessarily be consistent with movements in these data because of differences in underlying concepts. For example, stocks of materials are excluded from the indexes of manufacturing production and there are different weighting patterns used in combining the sales data compared with those underlying the total manufacturers' sales estimates published in 5629.0.*

## EXPLANATORY NOTES

This publication presents quarterly estimates of constant price manufacturing production. The estimates are shown as index numbers and are derived mainly from estimates of manufacturers' sales and stocks. These indexes are subject to a number of limitations and qualifications which are discussed below. It is important to take these into account when using the statistics.

**Scope of the estimates**

2. The constant price value of manufacturing production is generally defined as the constant price gross product of all manufacturing establishments classified to Division C: Manufacturing, of the *Australian Standard Industrial Classification (ASIC)*. The base year weights used in constructing the indexes in this publication have been derived from establishment data. However, the quarterly indicator series used relate to private manufacturing enterprises. The use of enterprise data means that the indexes have three important limitations as measures of manufacturing production:

- (a) changes in quarterly production by manufacturing establishments of non-manufacturing enterprises are not reflected in the indexes;
- (b) changes in a part of the quarterly production of non-manufacturing establishments of manufacturing enterprises are reflected in the indexes; and
- (c) changes in quarterly production by government bodies such as shipyards and railway workshops are not reflected in the indexes.

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

**Comparability with other estimates**

4. While the quarterly indexes in this publication can be viewed as an extension of those relating to the manufacturing sector in the annual publication *Australian National Accounts: Gross Product by Industry* (5211.0) it should be noted that the annual movements of the two sets of estimates will not necessarily be the same. The reason is that the data sources for the annual and quarterly series are largely independent of each other and are conceptually distinct. (The annual series are compiled using output data from the annual census of manufacturing establishments whereas the quarterly series draw on data relating to stocks held by and sales of goods manufactured by manufacturing enterprises.) Although the quarterly indexes have been constructed so as to minimise the impact of these differences in scope, significant differences remain between the quarterly and annual indexes.

5. The ABS publishes in a series of eight monthly and quarterly Production Bulletins (8357.0 to 8364.0) details of the quantities produced of about 600 manufacturing items. However, these items in total account for less than half of the output of the manufacturing sector, so that differences may occur between the general trends in those items and changes in the quarterly indexes of manufacturing production contained in this publication. The same comment applies to the Indexes of Quantity of Factory Production compiled by the ANZ Bank, which rely substantially on data published in 8357.0 to 8364.0. The comment applies with still greater force to preliminary details for approximately 30 production items published in the monthly publication *Production Statistics, Australia, Preliminary* (8301.0).

**Concepts and definitions**

6. The concepts, definitions and assumptions involved in calculating estimates of constant price gross product are given in detail in *Australian National Accounts: Concepts, Sources and Methods* (5216.0).

**Derivation of the estimates**

7. The estimates in this publication have been derived using the gross output method, i.e. gross product in the base year has been extrapolated by constant price estimates of output. A full description of the assumptions inherent in this methodology is contained in *Australian National Accounts: Concepts, Sources and Methods* (5216.0).

8. The measures of current price output underlying the indexes in this publication come mainly from estimates of manufacturers' sales and changes in stocks of finished goods and work-in-progress (published in aggregate in *Stocks Owned by Private Enterprises in Selected Industries and Sales of Goods Manufactured by Private Manufacturing Enterprises, Australia* (5629.0)). For two industry groupings (Printing and publishing, and Chemicals, petroleum and coal products) additional data are obtained for other selected income e.g. advertising revenue of printers and publishers, and commission revenue. All series have been adjusted to minimise discontinuities caused by sample revision and changes in industry of enterprise.

9. The component measures of constant price output are obtained by using price indexes to deflate the component current price estimates of sales, stocks, and other selected income.

10. The price indexes used to deflate current price sales are obtained from price data used in compiling the indexes published in *Price Indexes of Articles Produced by Manufacturing Industry, Australia* (6412.0) (APMI price indexes). The APMI indexes represent the price movements of commodities produced and sold by manufacturing establishments in each ASIC class. On the other hand, the current price sales figures are collected on a manufacturing enterprise basis. The price indexes for

each industry have been derived by combining the establishment-based APMI indexes according to turnover relationships from the 1979-80 integrated economic censuses.

11. Revaluation of stock levels is carried out largely using APMI-based price indexes. The constant price increase in stocks is then obtained as the difference between the closing and opening stock levels at constant prices. The 'other selected income' component is revalued using APMI price indexes.

12. A more detailed description of the methods used in compiling the estimates in this publication is contained in the June quarter 1983 issue of 5219.0.

#### Seasonal adjustment

13. 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. In interpreting particular seasonally adjusted statistics it is important to bear in mind 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 which are used are given in *Seasonally Adjusted Indicators, Australia* (1308.0).

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

15. 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. 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. 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 time series affected by revisions resulting from more recent data becoming available.

16. In this publication, the smoothed seasonally adjusted Index of Manufacturing Production has been derived by applying a 5-term Henderson-weighted moving average to the series. The weighting pattern for the final three values of the series is of the form shown below, where 'N' is the last quarter for which a value in the seasonally adjusted series is available.

#### 5-TERM HENDERSON

Trend-cycle value for quarter	Weight given to seasonally adjusted values in quarter				
	N-4	N-3	N-2	N-1	N
N	0	0	-.073	.403	.670
N-1	0	-.073	.294	.522	.257
N-2	-.073	.294	.558	.294	-.073

17. While this technique enables smoothed data for recent quarters to be produced, it does result in revisions to the smoothed series for the most recent two quarters as additional observations become available. There may also be revisions as a result of changes in the original data, and as a result of the re-estimation of the seasonal factors. Details of other trend-cycle weighting patterns can be found in Appendix D of *Seasonally Adjusted Indicators, Australia* 1983 (1308.0).

#### Reliability of estimates

18. Seasonally adjusted and constant price estimates are also subject to sampling variability. For seasonally adjusted estimates the standard errors in percentage terms closely approximate those for the unadjusted series. 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.

19. 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. In addition to the non-sampling errors which may occur in current price 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. Every effort is made to minimise non-sampling errors by careful design of forms, editing of data and efficient operating procedures.

#### Historical data

20. Data back to September quarter 1977 were contained in table 4 of the September quarter 1985 issue of this publication.

#### Related publications

21. Users may also wish to refer to the following publications:

*Australian National Accounts: Gross Product by Industry, 1982-83 and 1983-84* (5211.0)

*Constant Price Estimates of Manufacturing Production, 1982-83 and 1983-84* (8211.0)

*Price Indexes of Articles Produced by Manufacturing Industry, Australia* (6412.0)—issued monthly

*Stocks owned by Private Enterprises in Selected Industries and Sales of Goods Manufactured by Private Manufacturing Enterprises, Australia* (5629.0)—issued quarterly

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

IAN CASTLES  
Australian Statistician

TABLE 1 - PERCENTAGE CHANGE IN INDEXES OF MANUFACTURING GROSS PRODUCT AT AVERAGE 1979-80 PRICES BY INDUSTRY (A)  
- SEASONALLY ADJUSTED

	FOOD, BEVERAGES AND TOBACCO	TEXTILES, CLOTHING AND FOOTWEAR	PAPER AND PRINTING (B)	CHEMICALS PETROLEUM AND COAL PRODUCTS (C)	BASIC METAL PRODUCTS (29)	TRANSPORT EQUIPMENT (32)	FABRICATED METAL PRODUCTS (D) (31,33)	OTHER MANUFAC- TURING (E) (25,28,34)	TOTAL MANUFAC- TURING (21-34)
	(21)	(23,24)	(26)	(27)	(29)	(32)	(31,33)	(25,28,34)	(21-34)
QUARTER									
1979-80									
SEP	-0.5	-4.1	1.0	-0.2	5.1	-3.2	2.9	3.7	1.0
DEC	-2.1	3.4	-2.2	12.0	-3.3	0.8	-0.5	-6.6	-1.0
MAR	3.2	-0.8	5.6	-2.4	8.4	-11.1	0.8	3.5	1.3
JUN	0.5	-2.0	-1.9	-4.8	-13.8	-6.7	-1.0	1.6	-2.8
1980-81									
SEP	1.1	4.4	0.3	-1.1	-	0.7	1.9	1.0	1.0
DEC	1.8	-	-2.0	-1.1	6.3	7.3	3.3	2.0	2.4
MAR	-4.6	-5.6	0.2	2.8	-3.4	6.4	1.0	-0.2	-0.8
JUN	-0.6	4.2	-0.3	-1.3	-2.1	3.9	-0.4	0.8	0.3
1981-82									
SEP	2.3	-1.4	-	1.9	-1.8	4.1	1.5	2.2	1.4
DEC	1.9	-0.3	1.6	0.8	-1.8	3.0	-0.1	3.1	1.2
MAR	-1.3	-2.0	-0.6	-5.8	-1.5	-2.4	-	-2.4	-1.6
JUN	3.7	-0.2	2.2	4.5	-2.0	-0.2	-1.9	-3.6	-
1982-83									
SEP	-0.1	-1.1	-7.6	-4.3	-11.0	-7.9	-0.8	-5.8	-4.0
DEC	-3.1	-3.4	1.8	-4.6	-18.0	-16.0	-14.8	-6.1	-8.4
MAR	-0.2	-0.8	-0.5	-2.0	8.4	-6.0	-2.8	-2.8	-1.1
JUN	-3.5	0.4	0.1	5.7	4.2	-6.8	-2.8	2.1	-0.9
1983-84									
SEP	-2.4	-0.4	5.9	4.5	7.6	11.6	-2.7	4.5	2.2
DEC	2.4	1.3	4.5	-0.7	5.1	2.2	2.2	4.4	2.4
MAR	2.1	2.5	1.7	14.2	-1.6	3.9	1.3	5.0	3.1
JUN	-0.6	-2.5	0.7	-8.9	0.8	3.5	2.1	-6.6	-1.3
1984-85									
SEP	1.4	-3.1	-1.8	-1.6	1.2	1.0	0.3	3.8	0.6
DEC	-6.5	-1.5	-2.3	-2.0	4.1	0.1	-	-3.0	-2.0
MAR	5.0	-2.2	2.8	8.8	-8.0	4.1	4.5	1.6	2.5
JUN	1.7	11.4	2.5	-1.0	6.8	5.4	-0.1	-1.0	2.3
1985-86									
SEP	-0.1	-9.0	-0.9	-1.7	2.3	5.1	6.2	7.5	2.2
DEC	-3.0	8.9	5.1	2.7	5.3	-1.6	0.1	-3.2	0.4
MAR	2.1	-10.8	-3.4	2.5	-4.3	-7.2	3.1	-1.2	-1.3

(A) NUMBERS IN BRACKETS REFER TO ASIC SUBDIVISIONS. (B) PAPER, PAPER PRODUCTS, PRINTING AND PUBLISHING. (C) CHEMICALS, FERTILISERS, PAINTS, EXPLOSIVES, COSMETICS, OIL REFINING AND COAL PRODUCTS. (D) FABRICATED METAL PRODUCTS, OTHER INDUSTRIAL MACHINERY AND EQUIPMENT AND HOUSEHOLD APPLIANCES. (E) WOOD, WOOD PRODUCTS AND FURNITURE (EXCEPT SHEET METAL); GLASS, CLAY AND OTHER NON-METALLIC MINERAL PRODUCTS; LEATHER, RUBBER AND PLASTIC PRODUCTS AND OTHER MANUFACTURING N.E.C.

TABLE 2 - INDEXES OF MANUFACTURING GROSS PRODUCT AT AVERAGE 1979-80 PRICES BY INDUSTRY (A) - SEASONALLY ADJUSTED  
(BASE: 1979-80 = 1000)

	FOOD, BEVERAGES AND TOBACCO	TEXTILES, CLOTHING AND FOOTWEAR	PAPER AND PRINTING (B)	CHEMICALS PETROLEUM AND COAL PRODUCTS (C)	BASIC METAL PRODUCTS (D)	TRANSPORT EQUIPMENT (E)	FABRICATED METAL PRODUCTS (F)	OTHER MANUFACTURING (G)	TOTAL MANUFACTURING (H)
	(21)	(23, 24)	(26)	(27)	(29)	(32)	(31, 33)	(25, 28, 34)	(21-34)
WEIGHT (F)	21.2%	6.9%	8.7%	7.0%	11.7%	10.0%	19.3%	15.2%	100.0%
QUARTER									
1979-80									
SEP	999	984	994	940	1021	1069	1002	1030	1008
DEC	978	1017	972	1053	987	1078	997	962	998
MAR	1009	1009	1026	1028	1070	958	1005	996	1011
JUN	1014	989	1007	979	922	894	995	1012	983
1980-81									
SEP	1025	1033	1010	968	922	900	1014	1022	993
DEC	1043	1033	990	957	980	966	1047	1042	1017
MAR	995	975	992	984	947	1028	1057	1040	1009
JUN	989	1016	989	971	927	1068	1053	1048	1012
1981-82									
SEP	1012	1002	989	989	910	1112	1069	1071	1026
DEC	1031	999	1005	997	894	1145	1068	1104	1038
MAR	1018	979	999	939	881	1117	1068	1077	1021
JUN	1056	977	1021	981	863	1115	1048	1038	1021
1982-83									
SEP	1055	966	943	939	768	1027	1040	978	980
DEC	1022	933	960	896	630	863	886	918	898
MAR	1020	926	955	878	683	811	861	892	888
JUN	984	930	956	928	712	756	837	911	880
1983-84									
SEP	960	926	1012	970	766	844	814	952	899
DEC	983	938	1058	963	750	887	832	994	921
MAR	1004	961	1076	1100	738	922	843	1044	950
JUN	998	937	1084	1002	744	954	861	975	938
1984-85									
SEP	1012	908	1064	986	753	964	864	1012	944
DEC	946	894	1040	966	784	967	864	982	925
MAR	993	874	1069	1051	721	1007	903	998	948
JUN	1010	974	1096	1040	770	1061	902	988	970
1985-86									
SEP	1009	886	1086	1022	788	1115	958	1062	991
DEC	979	965	1141	1050	830	1097	959	1028	995
MAR	1000	861	1102	1076	794	1018	989	1016	982

(A) NUMBERS IN BRACKETS REFER TO ASIC SUBDIVISIONS. (B) PAPER, PAPER PRODUCTS, PRINTING AND PUBLISHING. (C) CHEMICALS, FERTILISERS, PAINTS, EXPLOSIVES, COSMETICS, OIL REFINING AND COAL PRODUCTS. (D) FABRICATED METAL PRODUCTS, OTHER INDUSTRIAL MACHINERY AND EQUIPMENT AND HOUSEHOLD APPLIANCES. (E) WOOD, WOOD PRODUCTS AND FURNITURE (EXCEPT SHEET METAL); GLASS, CLAY AND OTHER NON-METALLIC MINERAL PRODUCTS; LEATHER, RUBBER AND PLASTIC PRODUCTS AND OTHER MANUFACTURING N.E.C. (F) CONTRIBUTION OF EACH INDUSTRY TO TOTAL MANUFACTURING. SEE 'SCOPE OF THE ESTIMATES' IN THE EXPLANATORY NOTES.

TABLE 3 - INDEXES OF MANUFACTURING GROSS PRODUCT AT AVERAGE 1979-80 PRICES BY INDUSTRY (A)  
(BASE: 1979-80 = 1000)

	FOOD, BEVERAGES AND TOBACCO	TEXTILES, CLOTHING AND FOOTWEAR	PAPER AND PRINTING (B)	CHEMICALS PETROLEUM AND COAL PRODUCTS (C)	BASIC METAL PRODUCTS (D)	TRANSPORT EQUIPMENT (E)	FABRICATED METAL PRODUCTS (F)	OTHER MANUFAC- TURING (G)	TOTAL MANUFAC- TURING (H)
	(21)	(23,24)	(26)	(27)	(29)	(32)	(31,33)	(25,28,34)	(21-34)
WEIGHT (F)	21.2%	6.9%	8.7%	7.0%	11.7%	10.0%	19.3%	15.2%	100.0%
1979-80	1000	1000	1000	1000	1000	1000	1000	1000	1000
1980-81	1015	1016	996	970	945	986	1043	1038	1008
1981-82	1030	998	1004	978	888	1120	1064	1073	1027
1982-83	1022	948	955	911	701	867	909	926	914
1983-84	987	947	1058	1007	751	899	838	990	927
1984-85	990	922	1067	1011	759	998	882	995	947
QUARTER									
1979-80									
SEP	1009	1038	1031	940	1056	1127	1038	1079	1042
DEC	1062	1058	1012	1088	1001	1122	1062	1014	1051
MAR	962	907	959	977	1027	823	918	899	935
JUN	968	997	998	995	916	928	981	1008	973
1980-81									
SEP	1035	1089	1047	974	963	957	1053	1069	1028
DEC	1133	1072	1030	986	989	1003	1112	1100	1071
MAR	948	875	929	931	903	878	964	940	930
JUN	945	1029	979	988	925	1105	1041	1043	1004
1981-82									
SEP	1021	1102	1024	1003	956	1194	1112	1117	1067
DEC	1120	1019	1044	1019	899	1182	1131	1169	1089
MAR	969	876	936	887	831	953	974	973	938
JUN	1010	995	1011	1001	866	1151	1039	1032	1015
1982-83									
SEP	1063	1062	976	957	813	1113	1082	1019	1021
DEC	1110	948	998	911	631	885	936	973	942
MAR	971	828	896	829	638	691	785	806	817
JUN	943	952	948	948	720	780	833	905	875
1983-84									
SEP	967	1017	1047	993	812	922	847	992	937
DEC	1066	950	1099	971	750	904	877	1055	963
MAR	957	859	1009	1041	686	786	768	944	873
JUN	958	962	1076	1024	755	982	858	968	934
1984-85									
SEP	1019	997	1100	1011	801	1056	899	1055	984
DEC	1024	904	1080	972	782	982	909	1042	965
MAR	948	783	1002	996	669	859	822	903	872
JUN	970	1001	1088	1064	783	1092	900	981	967
1985-86									
SEP	1016	972	1122	1049	839	1225	996	1107	1035
DEC	1058	974	1185	1055	827	1113	1010	1090	1037
MAR	955	771	1033	1020	736	870	859	919	896

(A) NUMBERS IN BRACKETS REFER TO ASIC SUBDIVISIONS. (B) PAPER, PAPER PRODUCTS, PRINTING AND PUBLISHING. (C) CHEMICALS, FERTILISERS, PAINTS, EXPLOSIVES, COSMETICS, OIL REFINING AND COAL PRODUCTS. (D) FABRICATED METAL PRODUCTS, OTHER INDUSTRIAL MACHINERY AND EQUIPMENT AND HOUSEHOLD APPLIANCES. (E) WOOD, WOOD PRODUCTS AND FURNITURE (EXCEPT SHEET METAL); GLASS, CLAY AND OTHER NON-METALLIC MINERAL PRODUCTS; LEATHER, RUBBER AND PLASTIC PRODUCTS AND OTHER MANUFACTURING N.E.C. (F) CONTRIBUTION OF EACH INDUSTRY TO TOTAL MANUFACTURING. SEE 'SCOPE OF THE ESTIMATES' IN THE EXPLANATORY NOTES.