9219.0

Australian Bureau of Statistics

Information Paper

Motor Vehicle Use, Australia

Information paper

Motor Vehicle Use, Australia

W. McLennan
Australian Statistician

AUSTRALIAN BUREAU OF STATISTICS

EMBARGO: 11.30 AM (CANBERRA TIME) FRI 27 FEB 1998

ABS Catalogue no. 9219.0
ISBN 0 642 25728 0

Produced by the Australian Bureau of Statistics

INQUIRIES

- For information about other ABS statistics and services, please refer to the back of this publication.
- For further information please contact Robert Boyle on Brisbane (07) 3222 6294 or Peter Ball on Brisbane (07) 3222 6113.

CONTENTS

			Page
	Introduction		1
Tables	**1**	Estimated factors for total kilometres travelled, Australia, 12 months ended 30 September 1996	3
	2	Total kilometres travelled by type of vehicle, Australia, 12 months ended 30 September 1996	3
	3	Average kilometres travelled by type of vehicle, Australia, 12 months ended 30 September 1996	3

INTRODUCTION

Preliminary results from the 1995 Survey of Motor Vehicle Use (SMVU) were released in the publication *Survey of Motor Vehicle Use, Australia, Preliminary, 30 September 1995* (Cat. no. 9202.0) on 21 October 1996.

Since the release of the preliminary estimates, the ABS has undertaken further work on measuring the impact of recall bias on SMVU statistics. This paper presents the results of that work and provides adjusted estimates of total and average distance travelled for each of the main vehicle types included in the 1995 Survey. See below for a description of recall bias.

Background

The Survey of Motor Vehicle Use (SMVU) has been conducted approximately every three years since 1963. The main objective of the SMVU is to provide information needed by Commonwealth and State government agencies responsible for the allocation of funds for road maintenance and development, the construction of highways, the regulation of road transport operators and accident exposure and fuel use analysis. The survey collects vehicle usage data across all major vehicle types (cars, trucks, buses, etc.) and States and Territories. It is the only source of such information. The data are often used to indicate levels of road use and provide the broad context for project evaluation and measurement of growth rates in road use and traffic congestion.

The most recent statistics relating to motor vehicle use in Australia were released on 21 October 1996, in the publication *Survey of Motor Vehicle Use, Australia, Preliminary, 30 September 1995* (Cat. no. 9202.0). The methodology employed in that collection relied on owners of selected vehicles recalling details of vehicle use over the 12 months prior to receiving the survey questionnaire. However, most private vehicle owners do not keep sufficiently detailed records to provide the requested statistics. The degree of record keeping by freight vehicle and bus owners generally is better but, even for many of these vehicles, not all of the information sought is readily available. Errors in reporting which arise from inaccurate recollection are referred to as recall bias.

In the light of these concerns about data quality, the ABS undertook an extensive review during 1995 and 1996 of the methods employed to obtain vehicle use data, including tests of different methodological options. Following this review, the SMVU was redesigned from the previous triennial survey to an ongoing quarterly survey designed to produce annual estimates. The new quarterly survey was introduced from 1 August 1997.

The new survey methodology adopted is described as 'pre-advice', to reflect the fact that survey selections now receive early advice about their inclusion in order to encourage record keeping and minimise reliance on recall. At the start of the quarterly survey period, owners of vehicles selected in the survey are asked to return a questionnaire reporting selected vehicle characteristics and the vehicle's odometer reading. The owner is also alerted to an end-of quarter follow up questionnaire seeking details about the use of the vehicle over the quarter and a

Background *continued*

second odometer reading. Examples of the main items requested in the second questionnaire are included, together with an optional, simple worksheet to help compile the data during the period. The odometer component gives a records based estimate of total distance travelled, thus eliminating the recall bias inherent in the methodology of previous surveys.

The estimated recall bias factors

A set of factors has been produced which may be applied to 1995 statistics on total distance travelled (by vehicle type). These factors remove the estimated recall bias from these data and are based on estimates of total distance travelled, obtained from special surveys conducted for the 12 month period ending 30 September 1996. One survey was of a subset of 1995 SMVU respondents and sought an odometer reading at 30 September 1996. This was then compared with the odometer reading provided by those respondents 12 months earlier. The second was a separate survey which approached a different group of respondents and asked for recalled total distance travelled for the 12 months ended 30 September 1996.

The factors were calculated as the ratio of total distance travelled derived from the start and end of period odometer readings from the first survey, divided by the total distance travelled reported from the second survey. The factors could only be reliably estimated for total distance travelled by the main vehicle types at the Australian level and should not be applied to lower level detail. They also cannot be applied to data from surveys conducted prior to 1995 (refer to 'Historical comparisons', below).

The estimated factors for total distance travelled by type of vehicle during the 12 months ended 30 September 1996 are given in Table 1.

Reliability of estimates

As with other estimates based on data obtained from sample surveys, the estimated factors and the associated data estimates are subject to sampling variability. That is, they may differ from the figures that would have been obtained if all units had been included. One measure of the likely difference is given by the standard error, which indicates the extent to which an estimate might have varied by chance because only a sample of units was included. There are about two chances in three that a sample estimate will differ by less than one standard error from the figure that would have been obtained if all units had been included, and about 19 chances in 20 that the difference will be less than two standard errors.

Another measure of sampling variability is the relative standard error (RSE) which is obtained by expressing the standard error as a percentage of the estimate to which it refers. The RSE is a useful measure in that it provides an immediate indication of the percentage error likely to have occurred due to sampling. Relevant RSEs are provided in the following Tables.

1 ESTIMATED FACTORS FOR TOTAL KILOMETRES TRAVELLED, AUSTRALIA, 12 MONTHS ENDED 30 SEPTEMBER 1996

Body type	*Estimated factor*	*RSE %*
Passenger vehicles (a)	0.914	5
Motor cycles (b)	0.705	11
Light commercial vehicles	1.011	7
Rigid trucks	1.007	5
Articulated trucks	0.954	5
Non-freight carrying trucks	0.821	20
Buses (a)	1.123	6
Total (a)	0.935	4

(a)The estimated factor is statistically significant at the 10 per cent level.
(b)The estimated factor is statistically significant at the 5 per cent level.

Comparison between the preliminary and adjusted estimates

The factors shown in Table 1 have been applied to the preliminary estimates of total distance travelled by the main vehicle types during the 12 months ended 30 September 1995. Table 2 shows adjusted statistics with the estimated recall bias removed.

2 TOTAL KILOMETRES TRAVELLED BY TYPE OF VEHICLE, AUSTRALIA, 12 MONTHS ENDED 30 SEPTEMBER 1996

Body type	*Preliminary estimate Million Kms*	*RSE %*	*Estimated factor*	*Adjusted estimate Million Kms*	*RSE%*
Passenger vehicles	123 691	3	0.914	113 054	6
Motor cycles	1 526	7	0.705	1 076	13
Light commercial vehicles	27 751	3	1.011	28 056	7
Rigid trucks	6 725	2	1.007	6 772	6
Articulated trucks	5 094	2	0.954	4 860	6
Non-freight carrying trucks	249	9	0.821	204	22
Buses	1 479	2	1.123	1 661	6
Total	166 514	2	0.935	155 683	5

Table 3 shows adjusted data for average kilometres travelled by the main vehicle types during the 12 months ended 30 September 1995. These have been derived by dividing the adjusted total distances travelled data by the number of vehicles estimated to be registered for use during the year.

3 AVERAGE KILOMETRES TRAVELLED BY TYPE OF VEHICLE, AUSTRALIA, 12 MONTHS ENDED 30 SEPTEMBER 1996

Body type	*Preliminary estimate Thousand Kms*	*RSE %*	*Adjusted estimate Thousand Kms*	*RSE%*
Passenger vehicles	14.4	3	13.1	6
Motor cycles	5.2	7	3.7	13
Light commercial vehicles	17.7	2	17.9	7
Rigid trucks	20.0	2	20.2	6
Articulated trucks	87.9	2	83.9	6
Non-freight carrying trucks	15.9	7	13.0	22
Buses	32.5	2	36.5	6
Total	15.2	2	14.3	5

Comparison between the preliminary and adjusted estimates *continued*

When the factors are applied to data collected by the old recall methodology, the estimated total distance travelled by motor vehicles is revised from 166,514 million kilometres to 155,683 million kilometres, a reduction of 7 per cent. The average kilometres travelled by all motor vehicles is revised accordingly, from 15,200 kilometres to 14,300 kilometres. This decrease is mainly caused by passenger vehicles, where the total distance travelled is revised from 123,691 million kilometres to 113,054 million kilometres. The average kilometres travelled by passenger vehicles is revised from 14,400 kilometres to 13,100 kilometres, a reduction of 9 per cent.

The adjusted estimates of total and average distance travelled by motor cycles, articulated trucks and non-freight carrying trucks were also reduced when the factors were applied.

Appropriate use of the estimated recall bias factors

Reliable estimates for the factors could be produced only for total distance travelled by the main vehicle types at the Australian level. The level of recall bias in other data from the 1995 SMVU, including dissections of total distance travelled, is unknown. Consequently, users are cautioned against applying the factors to data other than those explicitly adjusted in this paper.

The estimated recall bias factors only remove one source of non-sampling error from total distance travelled data. Other sources of non-sampling error can be present in any statistical collection. For example, it can occur because of non-response to the survey, imperfections in reporting by respondents, definition or classification difficulties, or errors in transcribing and processing the data. While these effects are not quantifiable, every effort is made to minimise the impact through the design and testing of questionnaires and the use of appropriate operating procedures.

Historical comparisons

The estimated recall bias factors were compiled from special surveys conducted for the 12 month period ending 30 September 1996. These surveys incorporated the matched odometer readings component of the new methodology.

It is recognised that the recall problem was inherent in all surveys conducted up to 1995. Users should therefore not make direct comparisons between adjusted 1995 data and unadjusted data from previous periods. For all vehicle types, the best estimate of changes over time in distance travelled is likely to be provided by the unadjusted series.

There is no reliable measure of how recall biases have varied over time. However, taking into account earlier studies, estimates of total and average distance travelled for passenger vehicles and total vehicles are likely also to have been overstated in previous surveys. Similar generalisations cannot be made for other vehicle types. In particular, for commercial vehicles, record keeping practices appear to have improved over time, with a consequent reduction in recall bias.

Future release of motor vehicle use statistics

The ABS intended to publish revised estimates in the final publication *Survey of Motor Vehicle Use, Australia, 30 September 1995* (Cat. no. 9208.0), previously advertised for release. However, because estimates of the bias have only been able to be produced at a very broad level and because there were no other revisions, it has been decided not to produce that publication.

The new methodology SMVU was implemented as an ongoing quarterly survey from 1 August 1997. It is intended to produce estimates on an annual basis, with the first broad estimates for the year 1 August 1997 to 31 July 1998 to be released in early 1999. It is expected that more detailed information will be published every two or three years based on survey results accumulated over the longer periods.

Australian Bureau of Statistics

For more information . . .

The ABS publishes a wide range of statistics and other information on Australia's economic and social conditions. Details of what is available in various publications and other products can be found in the ABS Catalogue of Publications and Products available from all ABS Offices.

ABS Products and Services

Many standard products are available from ABS bookshops located in each State and Territory. In addition to these products, information tailored to the needs of clients can be obtained on a wide range of media by contacting your nearest ABS Office. The ABS also provides a Subscription Service for standard products and some tailored information services.

National *Dial-a-Statistic* Line

0055 86 400

Steadycom P/L: premium rate 25c/20 secs.

This number gives 24-hour access, 365 days a year, for a range of important economic statistics including the CPI.

Internet

http://www.abs.gov.au

A wide range of ABS information is available via the Internet, with basic statistics available for each State, Territory and Australia. We also have Key National Indicators, ABS product release details and other information of general interest.

Sales and Inquiries

client.services@abs.gov.au

National Mail Order Service	(02) 6252 5249
Subscription Service	1300 366 323

	Information Inquiries	Bookshop Sales
CANBERRA	(02) 6252 6627	(02) 6207 0326
SYDNEY	(02) 9268 4611	(02) 9268 4620
MELBOURNE	(03) 9615 7755	(03) 9615 7755
BRISBANE	(07) 3222 6351	(07) 3222 6350
PERTH	(08) 9360 5140	(08) 9360 5307
ADELAIDE	(08) 8237 7100	(08) 8237 7582
HOBART	(03) 6222 5800	(03) 6222 5800
DARWIN	(08) 8943 2111	(08) 8943 2111

Client Services, ABS, PO Box 10, Belconnen ACT 2616

2921900001950
ISBN 0 642 25728 0

RRP $10.00

Produced by the Australian Bureau of Statistics