

10/1985

THE AUSTRALIAN NATIONAL UNIVERSITY
FACULTY OF ECONOMICS AND COMMERCE
DEPARTMENT OF STATISTICS
ANNUAL REPORT 1984

General Comments and Courses

The research and teaching program of the Statistics Department is concerned with mathematical statistics, econometrics, probability theory and operational research. The Department can therefore be regarded as multidisciplinary in nature, as it provides courses which in many universities would be found in two or three separate Departments. This arrangement may have academic advantages but is subject to administrative stress.

The Diploma programmes in Statistics and Econometrics, which were introduced in 1982, appear to meet a real need. The Diploma in Statistics had a total enrolment over the year of twenty students and nine students were enrolled for the Diploma in Econometrics. All except three of these are part-time students mostly employed in work of a statistical nature and the programmes seem to be fulfilling their aim of providing appropriate instruction in areas of direct relevance to professional activity.

The pattern of first year courses introduced in 1982 is now established. B.Ec. students enrol in the full year units Economic Statistics A or B, depending on their preparation in mathematics, whilst Science and Arts students may take the semester units Statistical Techniques 1 and 2. An innovation in 1983 was an introduction to the use of statistical packages in Statistical Techniques 2. Except for those taking Statistical Techniques 1 only, all first year students in the Department are now required to gain some experience of using a computer.

The Statistical Consultant to The Faculties, Mr R.B. Cunningham, is attached to the Department for administrative purposes. His duties are to provide advice on statistical matters to staff and research students from all parts of The Faculties. He has in fact also been consulted by some members of the Research Schools. The demand for his services has exceeded expectation and consideration must be given to providing additional assistance in this area. The disciplines providing the greatest number of clients were Psychology, Forestry and Zoology. The major subject areas of consultation were the design of experiments, the analysis of survival data, cluster analysis, regression analysis, and statistical computing.

Enrolments and Examination Results

Numbers of enrolments in units offered by the Department were generally similar to those in 1983. A table of comparative failure rates for students attempting final examinations is presented for the period 1975-1984 below. The increased second year failure rate is thought to be due to weak preparation in calculus amongst this particular group of students.

Failure Rates, %

	Stats I	Stats II	Stats III	Operational Research
1975	11	10	7	13
1976	14	7	8	6
1977	15	8	5	12
1978	18	17	5	7
1979	18	7	10	12
1980	18	6	10	18
1981	18	13	15	2
1982	20	13	5	9
1983	15	16	4	7
1984	19	22	8	12

The figures were drawn from those semester units most closely approximating the old full year units.

Students taking the full year unit Economic Statistics were divided into A and B on the basis of their mathematical preparation. This streaming of students was done in the same way that students were allocated to either Statistics A03 or Statistics A01 in the past. The proportion initially allocated to B, the less well prepared stream, in 1984 was approximately 35%. Some results on pass rates classified by sex may be of interest. The following table refers to Economic Statistics students sitting the final examination in 1984 and indicates that female students in both streams had a significantly higher pass rate than their male colleagues.

	Eco Stats A			Eco Stats B		
	Male	Female	Total	Male	Female	Total
Number	119	94	213	43	30	73
No. passing	92	82	174	25	25	50
% passing	77	87	82	58	83	68

Graduate Students

During the year there were thirty-nine students enrolled for higher degrees and Diplomas; six for the Ph.D., three for the Masters degree by research, one for the Masters degree by research and coursework and twenty-nine for Diploma courses.

Staff

Professor and Head of Department	- C.R. Heathcote, BA <i>W.Aust.</i> , MA <i>Melb.</i> , Ph.D.
Professor and Dean of Faculty	- R.D. Terrell, B <i>Ec Adel.</i> , Ph.D.

Staff (contd.)

- Readers
- R.P. Byron*, MEd *W.Aust.*, Ph.D. *Lond.*
 - D.F. Nicholls, BSc *New Eng.*, MSc, Ph.D.
- Senior Fellow
- A.R. Pagan, BEc *Q'ld*, Ph.D. (joint appointment with RSSS)
- Senior Lecturers
- J.J. Beggs, BEc *Q'ld*, Ph.D. *North-western*
 - P.G. Hall, BSc *Syd.*, MSc, D.Phil. *Oxon.*
 - S. John, BSc *Trav.*, MSc *Kerala*, Ph.D. *Indian Stat. Inst.*
 - J.H.T. Morgan, BA *Cantab.*, MSc *Case Inst. Tech.*
 - P. Winer, BSc *Rand*
- Lecturers
- A.D. Hall, BEc *Adel.*, MEd, Ph.D. *Lond.*
 - M.J. McAleer, BEc *Monash*, MEd *Monash*, Ph.D. *Queen's*
 - T.J. O'Neill**, BSc *Adel.*, MS *Stanford*, Ph.D. *Stanford*
- Senior Lecturer
(Statistical Consultant)
- R.B. Cunningham, BSc *New Eng.*, Dip. *Ed. New Eng.*, MSc
- Tutor
- Heather Anderson, BSc *New Eng.*
- Temporary Fractional Tutor
- Elke Chan, BEc/BSc, Grad. Dip. (Comp. Sc.) *CCAE.*
- Research Assistant
- Ellen M. Ward, BA *Fordham*
- Computer Programmer
- J.H-W. Penm, BSc *Nat. Taiwan Normal Univ.*, MSc *Pittsburgh*, Ph.D. *Pittsburgh*

* Outside Studies January-June, 1984.

** Outside Studies 1984.

Visitors

- Dr M.H. Pesaran, Cambridge University. (9.7.84. - 19.9.84.)
- Dr N. Dastoor, University of Liverpool. (22.7.84. - 24.8.84.)
- Professor J.D. Sargan, London School of Economics. (27.7.84. - 22.8.84.)
- Professor M.J. Desai, London School of Economics (3.9.84. - 24.10.84.)
in association with Centre for Research on Federal Financial Relations.
- Professor L. Devroye, McGill University. (1.1.84. - 29.6.84.) in association with Department of Computer Science, The Faculties and the Mathematical Sciences Research Centre.
- Professor D.B. Pollard, Yale University. (18.5.84. - 5.7.84.) in association with the Mathematical Sciences Research Centre.
- Dr R.L. Smith, University of London. (3.7.84. - 13.9.84.) in association with the Mathematical Sciences Research Centre.
- Dr J.T. Wood, CSIRO Division of Mathematics and Statistics. (July-December 1984).
- Professor I.M. Johnstone, Stanford University. (3.9.84. - 21.9.84.)

Visitors (contd.)

Professor S.P. Sethi, University of Toronto. (9.11.84. - 3.12.84.)
in association with Department of Economics, The Faculties and
the Mathematical Sciences Research Centre.

Faculties Research Fund Awards for 1984 were granted to
Dr M. McAleer towards work on Monte Carlo simulations in economic
models; to Dr P. Hall (jointly with Dr B. Selinger of the Department
of Chemistry) to support work on analytical methods of deconvolution;
to Professor R.D. Terrell for work on reduced subset time serial models
in economics; to Mr R.B. Cunningham, Professor C.R. Heathcote and
Dr D.F. Nicholls for work on the statistical analysis of water quality
data from the River Murray system (this is also supported by the River
Murray Commission). ARGS grants were made to Professor R.D. Terrell
and Dr M. McAleer and the Econometrics group was awarded a grant from
the World Bank for support towards a project on Household Budget Surveys.

Other staff activities during the year include Professor Terrell's
continuation as Dean of the Faculty of Economics and Commerce; the
granting of a Hallsworth Fellowship of the University of Manchester and
a Visiting Scholarship, Trinity College, Cambridge, to Dr McAleer;
the election of Dr P. Hall as Fellow of the Institute of Mathematical
Statistics; consulting work by Mr Cunningham and Dr Nicholls for the
Department of Science and Technology, the Department of Housing and
Construction, and the Senate Standing Committee on Finance and
Government Operations; and collaborative work by Dr Byron with the
Biro Pusat Statistik of Indonesia.

Research by members of the Department was mainly in the fields of
applied probability (particularly limit theorems), multivariate
analysis, non-standard maximum likelihood, robust estimation methods,
changing parameter regressions, non-linear estimation methods and
hypothesis testing, time dependent systems of equations, econometric
model building, specification testing and model selection. Research
activity benefited from the visitor and seminar programmes.

Publications

- Beggs, J.J. "Disinformation: Properties of market forecasts of
benevolent opinion leaders", *Behavior Science*, 29 (1984), 33-36.
- Beggs, J.J. "Long run trends in patenting", in *R & D Patents and Productivity*
edited by Z. Griliches. University of Chicago Press (1984), 155-169.
- Beggs, J.J. "Comment on 'Extended accelerator model of R & D and physical
investment' by J. Mairesse and A. Siu", in *R & D Patents and Productivity*
edited by Z. Griliches. University of Chicago Press (1984), 295-297.
- Beggs, J.J. "The value of travel to recreational facilities: The
uncertainty issue", *International Journal of Transport Economics*, 11
No.1 (1984), 53-59.
- Byron, R.P. "On the flexibility of the Rotterdam Model", *European
Economic Review*, 24 No.3 (1984), 273-284.

Publications (contd.)

- †Austin, M.P., Cunningham, R.B. and †Fleming, P.M. "New approaches to direct gradient analysis using environmental scalars and statistical curve-fitting procedures", *Vegetatia*, 55 (1984), 11-27.
- †Morton, R. and Cunningham, R.B. "Longitudinal profile of trends in salinity in the River Murray", *Australian Journal of Soil Research*, 23 (1985), 1-13.
- Hall, P. "Integrated square error properties of kernel estimators of regression functions", *Annals of Statistics*, 12 (1984), 241-260.
- Hall, P. and *Welsh, A.H. "Best attainable rates of convergence for estimates of parameters of regular variation", *Annals of Statistics*, 12 (1984), 1079-1084.
- Hall, P. "Chi squared approximations to the distribution of a sum of independent random variables", *Annals of Probability*, 11 (1983), 1028-1036.
- Daley, D.J. and Hall, P. "Limit laws for the maximum of weighted and shifted i.i.d. random variables", *Annals of Probability*, 12 (1984), 571-587.
- Hall, P. "Orthogonal series distribution function estimation, with applications", *Journal of the Royal Statistical Society Series B*, 45 (1983), 81-88.
- Hall, P. "Sequential estimation saving sampling operations", *Journal of the Royal Statistical Society Series B*, 45 (1983), 219-223.
- Hall, P. "An optimal property of kernel estimators of a probability density", *Journal of the Royal Statistical Society Series B*, 46 (1984), 134-138.
- Hall, P. "On the roles of the Bessel and Poisson distributions in chemical kinetics", *Journal of Applied Probability*, 20 (1983), 585-599.
- Hall, P. "On the interpretation of random fluctuations in competing chemical systems", *Journal of Applied Probability*, 20 (1983), 877-883.
- Hall, P. "A unified approach to the correction of normal approximations", *Society for Industrial and Applied Mathematics Journal of Applied Mathematics*, 43 (1983), 1187-1193.
- †Gregory, A.W. and McAleer, M. "Testing non-nested specifications of money demand for Canada", *Canadian Journal of Economics*, 16 (1983), 593-602.
- Pagan, A.R. and Nicholls, D.F. "Estimating predictions, prediction errors and their standard deviations using constructed variables", *Journal of Econometrics*, 24 (1984), 293-310.

†Not a member of this university.

*Former member.

Publications (contd.)

- Pagan, A.R. and Hall, A.D. "Diagnostic tests as residual analysis", *Econometric Reviews*, 2 No.2 (1983), 159-218. Reply, 2 No.2 (1983), 249-254.
- Pagan, A.R., Hall, A.D. and Trivedi, P.K. "Assessing the variability of inflation", *Review of Economic Studies*, L No.4 (1983), 585-596.
- Penm, J.H-W. and Terrell, R.D. "Multivariate subset autoregression", *Communications in Statistics B*, 13 No.4 (1984), 449-461.
- Penm, J.H-W. and Terrell, R.D. "Multivariate subset autoregressive modelling with zero constraints for detecting 'overall causality'", *Journal of Econometrics*, 24 (1984), 311-330.

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

FIRST SEMESTER

Percentage of Number Enrolled

Percentage of Number Sitting

1	2	Percentage of Number Enrolled				Percentage of Number Sitting						
		3	4	5	6	7	8	9	10	11	12	
Subject or Unit	Effective enrolments	Sitting	Wastage	Did not sit Failure (ABS/N) (W/N)	Sat Failure	High Distinction	Distinction	Credit	Pass with Merit	Pass	Fail	
Stat Tech 1	No. %	154 (100)	137 (89)	15 (10)	2 (1)	21 (14)	12 (9)	13 (9)	38 (28)	-	53 (39)	21 (15)
Stats B01	No. %	126 (100)	114 (90)	7 (6)	5 (4)	34 (27)	7 (6)	15 (13)	19 (17)	-	39 (34)	34 (30)
Stats C01	No. %	25 (100)	22 (88)	3 (12)	0 (0)	4 (16)	3 (14)	3 (14)	6 (27)	-	6 (27)	4 (18)
Stats C03	No. %	58 (100)	54 (93)	3 (5)	1 (2)	7 (12)	4 (7)	8 (15)	12 (22)	-	23 (43)	7 (13)
Stats C08	No. %	11 (100)	10 (91)	1 (9)	0 (0)	0 (0)	4 (40)	2 (20)	1 (10)	-	3 (30)	0 (0)
Ecomet B05	No. %	25 (100)	18 (72)	5 (20)	2 (8)	4 (16)	0 (0)	1 (6)	1 (6)	-	12 (66)	4 (22)
Ecomet C05	No. %	14 (100)	13 (93)	1 (7)	0 (0)	1 (7)	3 (23)	2 (15)	2 (15)	-	5 (38)	1 (8)

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

SECOND SEMESTER

1	2	Percentage of Number Enrolled				Percentage of Number Sitting					
		3	4	5	6	7	8	9	10	11	12
Subject or Unit	Effective enrolments	Sitting	Wastage	Did not sit Failure (ABS/N) (W/N)	Sat Failure	High Distinction	Distinction	Credit	Pass with Merit	Pass	Fail
Stat Tech 1	No. 58 % (100)	50 (86)	4 (7)	4 (7)	7 (12)	6 (12)	9 (18)	15 (30)	-	13 (26)	7 (14)
Stat Tech 2	No. 104 % (100)	90 (87)	9 (8)	5 (5)	17 (16)	11 (12)	11 (12)	20 (22)	-	31 (35)	17 (19)
Stats B02	No. 56 % (100)	48 (86)	4 (7)	4 (7)	5 (9)	11 (23)	14 (30)	4 (8)	-	14 (29)	5 (10)
Stats B04	No. 30 % (100)	23 (77)	5 (17)	2 (6)	5 (17)	1 (4)	4 (17)	6 (26)	-	7 (30)	5 (22)
Stats C02	No. 19 % (100)	18 (95)	0 (0)	1 (5)	0 (0)	2 (11)	2 (11)	8 (45)	-	6 (33)	0 (0)
Stats C04	No. 36 % (100)	33 (92)	3 (8)	0 (0)	4 (11)	0 (0)	5 (15)	11 (33)	-	13 (40)	4 (12)
Ecomet B03	No. 22 % (100)	15 (68)	7 (32)	0 (0)	1 (5)	4 (27)	5 (33)	3 (20)	-	2 (13)	1 (7)
Ecomet B06	No. 13 % (100)	11 (85)	2 (15)	0 (0)	2 (15)	0 (0)	2 (18)	4 (37)	-	3 (27)	2 (18)
Ecomet C06	No. 12 % (100)	8 (67)	3 (25)	1 (8)	0 (0)	1 (12)	3 (38)	0 (0)	-	4 (50)	0 (0)

THE AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

		FULL YEAR										
		Percentage of Number Enrolled				Percentage of Number Sitting						
1	2	3	4	5	6	7	8	9	10	11	12	
Subject or Unit	Effective enrolments	Sitting	Wastage	Did not sit Failure (ABS/N) (W/N)	Sat Failure	High Distinction	Distinction	Credit	Pass with Merit	Pass	Fail	
Eco Stats A	No. 245 % (100)	215* (88)	25 (10)	5 (2)	39 (16)	13 (6)	30 (14)	56 (26)	-	75 (35)	39 (18)	
Eco Stats B	No. 139 % (100)	74** (53)	57 (41)	8 (6)	23 (16)	1 (1)	2 (3)	14 (19)	-	33 (45)	23 (31)	

* 2 examinations deferred

** 1 examination deferred

Figures do not include postgraduate students.

	Enrolled	Sitting	Result
Final Honours Econometrics	-	-	-
Econometrics/Economics	1	1	Result deferred
Statistics	-	-	-
Statistics/Accounting	1	-	-
Diploma in Econometrics	7	2	2P
Diploma in Statistics	19	8	5PM, 3P
Masters Degree by Research	2	-	-
Masters Degree by Research & Coursework	1	-	-
Ph.D.	6	1	1 Awarded