

25/1979

THE AUSTRALIAN NATIONAL UNIVERSITY

FACULTY OF ECONOMICS

DEPARTMENT OF STATISTICS

ANNUAL REPORT 1978

General Comments and Courses

The research and teaching programme 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 has academic advantages but does place a strain on staff in circumstances of constrained resources.

The Masters by Coursework programme introduced in 1977 continued in 1978 at an increased level of activity. Seven students were enrolled in the course and a further five were attending qualifying courses. Whilst the programme is predominantly supported by part-time students it is hoped to enrol more full time students in 1979. Students attending were employed mainly at the Australian Bureau of Statistics and the CSIRO, but included a staff member from CCAE. A feature is the co-operation received from senior statisticians in both the Bureau and CSIRO. This is particularly welcome since a major purpose of the programme is to train Honours graduates in Mathematical Statistics for careers as consulting statisticians in industry and government. Also, a desirable broadening side-effect became evident due to the attendance at selected courses by staff and research students from within the Department.

The semester unit, Statistics C08, also introduced in 1977, fulfilled its role as a service unit for advanced undergraduates and beginning postgraduate students in the social and biological sciences. The syllabus emphasises applied statistical procedures (including packaged programmes) useful in these and related disciplines, and it is planned to continue the unit.

The Departments of Statistics and Computer Science are carrying out investigatory work in computer aided instruction (C.A.I.). A tutorial room has been equipped to allow the use in tutorial classes of the UNIVAC 1100/42 to illustrate some fundamental statistical concepts and was successfully used to a limited extent. However, doubts remain about the widespread use of this mode of instruction and it is intended to review the matter early in 1979.

Two parallel sequences of lectures were offered in the first year first semester unit Statistics A01, one sequence with the three weekly lectures timetabled at 8.0 a.m. Some sixty students indicated that the holding of lectures at this hour was convenient due to timetable

considerations or for reasons of employment and it is planned to continue with the arrangement in 1979. Timetabling continues to pose problems since students from the three faculties of Arts, Economics and Science take units in statistics.

Visitors contributed actively to the work of the Department during 1978. Staff and students in Econometrics benefited from the three month stay of Professor M. Hatanaka of Osaka University, Japan, who contributed to the seminar programme and consulted widely. Visitors to the Mathematical Statistics section were Professor J. Galambos of Temple University, Philadelphia, and Dr D. Pollard of Yale and the Ruhr University, Bochum. Both gave short series of seminars-lectures to advanced students and staff. The Department continues to find the visitors' programme extremely valuable.

Seminar participation falls under two headings. Econometrics seminars, often in conjunction with members of the Economics Department, were held weekly, and further contributions were made to the series "Working Papers in Economics and Econometrics". The Mathematical Statistics group within the Department continued to participate in the research seminars organised jointly with the Department of Statistics IAS and the CSIRO Division of Mathematics and Statistics.

Research by members of the Department was mainly in the fields of applied probability (particularly limit theorems, branching processes and characteristic functions), history of probability, 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 and specification testing and Monte Carlo studies.

A Reserve Bank Economic and Financial Research Grant was awarded to Dr Pagan and Professor Terrell to continue the construction of a data bank of economic time series. The data bank is nearing completion and will assist the expansion of research work in applied economics by academic staff and postgraduate students throughout the university. Meanwhile discussions are proceeding on the establishment of an Econometric Research Unit.

The only member on study leave during 1978 was Professor Terrell who spent second term at the London School of Economics before returning to Canberra to work at the Department of Economics, IAS.

Dr D.C. Chant left the university early in 1978 to take up an appointment as lecturer in the University of Queensland. He was replaced by Dr Peter Hall of the University of Melbourne who arrived at the beginning of third term. Dr Hall's arrival is expected to strengthen the Department's work in probability theory and theoretical statistics.

The Departmental Committee has met regularly during the year with Dr Valentine, the Deputy Chairman, conducting these meetings. The committee has been assisted in its work by the constructive attitude of all members. Liaison Committees were set up in several semester units and this allowed students an opportunity to discuss their views on the organisation and course content of a unit with all involved in teaching that unit. However, the majority of students appeared to display little interest in these activities.

Enrolments and Examination Results

Total enrolments in the Statistics Department at 30 April 1978 as measured in Weighted Student Units remained much the same as in the previous year.

A table of comparative failure rates for students attempting final examinations is presented for the period 1974-1978 below.

Failure Rates, %

| | Stats I | Stats II (Pass plus Honours) | Stats III (Pass plus Honours) | Operational Research |
|------|---------|------------------------------------|-------------------------------------|-------------------------|
| 1974 | 17 | 16 | 8 | 16 |
| 1975 | 11 | 10 | 7 | 13 |
| 1976 | 14 | 7 | 8 | 6 |
| 1977 | 15 | 8 | 5 | 12 |
| 1978 | 18 | 17 | 5 | 7 |

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

Final Honours students in Statistics achieved one H2A and one H2B.

Graduate Students

During the year there were twenty-three students enrolled for higher degrees; twelve for the Ph.D, four for the Masters degree (by thesis) and seven for the Masters degree (by coursework) in Statistics. In addition six Masters qualifying students were enrolled in the Department.

Staff

- Professor and Head of Department - C.R. Heathcote, BA *W.Aust.*, MA *Melb.*, Ph.D
- Professor - R.D. Terrell, BEc *Adel.*, Ph.D
- Readers - R.P. Byron, MEc *W.Aust.*, Ph.D *Lond.*
- E. Seneta, MSc *Adel.*, Ph.D
- Senior Lecturers - S. John, BSc *Trav.*, MSc *Kerala*, Ph.D
Indian Stat. Inst.
- J.H.T. Morgan, BA *Cantab.*, MSc *Case Inst. Tech.*
- D.F. Nicholls, BSc *New Eng.*, Ph.D
- A.R. Pagan, BEc *Q'ld.*, Ph.D
- T.J. Valentine, BEc *Syd.*, MA *Princeton*,
Ph.D *Princeton.*
- P. Winer, BSc *Rand.*

- Lecturers - P.G. Hall, BSc *Syd.*, MSc, D.Phil. *Oxon*
(From 14.9.78.)
- T.J. O'Neill, BSc *Adel.*, MS *Stanford*, Ph.D
Stanford.
- Lecturing Fellow - A.D. Hall, BEc *Adel.*, MEc, Ph.D *Lond.*
- Tutors - N. Frances MacNally, BSc *Lond.*
- K.R. Sawyer, BSc *W.Aust.*, MEc.
- Temporary Tutor - B.R. Clarke, BSc *Flinders*.
- Computer Programmers - Patricia N. McCarter, BSc *W.Aust.* (To 6.10.78.)
- J.H.W. Penn, BSc *Nat. Taiwan Normal Univ.*,
MSc *Pittsburgh*, Ph.D *Pittsburgh* (From 12.10.78.)
- Assistant Computer Programmer - A.D. Glenn; BSc.
- Research Assistant - Ellen M. Ward, BA *Fordham*.
- Temporary Research Assistants - Ann Spurr, B.Com. *Melb.* (From 18.5.78. to
12.6.78.)
- Teddy O. Amoloza, BS *Univ. Philippines*, MSc
Univ. Philippines (From 3.7.78.)
- J.H.W. Penn, BSc *Nat. Taiwan Normal Univ.*,
MSc *Pittsburgh*, Ph.D *Pittsburgh* (From
10.7.78. to 11.10.78.)
- Temporary Research Assistant (Reserve Bank Grant, R.D. Terrell and A.R. Pagan) - A.C. Cameron, BEc.

Publications

- Byron, R.P., "A comment on the linear expenditure system", Australian Economic Papers, June 1978, 190-192.
- Hall, P., "Some asymptotic expansions of moments of order statistics", Stochastic Processes and Their Applications, 7 (1978), 265-276.
- Hall, P., "On the duality between the behaviour of sums and sums of squares of independent random variables", Mathematical Proceedings of the Cambridge Philosophical Society, 84 (1978), 117-122.
- Hall, P., "On the rate of convergence of moments in the central limit theorem", Journal of the Australian Mathematical Society, Series A, 25 (1978), 250-256.
- Hall, P., "Representations and limit theorems for extreme value distributions", Journal of Applied Probability, 15 (1978), 639-644.

- †Chambers, R.L. & Heathcote, C.R., "A linear model with errors lacking a variance, II", Australian Journal of Statistics, 20 (1978), 161-175.
- John, S., "Unbiased and upper critical values of mean trace of multivariate beta for testing difference of two covariance matrices or several means", Communications in Statistics: Simulation and Computation, B6 (1977), 89-96.
- Hannan, E.J. & Nicholls, D.F., "The estimation of the prediction error variance", Journal of the American Statistical Society, 72 (1977), 834-840.
- Pagan, A.R., "Rational and polynomial lags: The finite connection", Journal of Econometrics, 8 (1978), 247-254.
- Pagan, A.R. & Byron, R.P., "A synthetic approach to the estimation of models with autocorrelated disturbance terms", in A.R. Bergstrom et. al. Stability and Inflation (Wiley, New York, 1978), 237-256.
- *Heyde, C.C. & Seneta, E., I.J. Bienaymé. Statistical Theory Anticipated, (Springer-Verlag, New York, 1977).
- *Hudson, I.L. & Seneta, E., "A note on simple branching processes with infinite mean", Journal of Applied Probability, 14 (1977), 836-842.
- *Allen, B., Anderssen, R.S. & Seneta, E., "Computation of stationary measures for infinite Markov chains", TIMS Studies in the Management Sciences, 7 (1977), 13-23.
- Albon, R.P. & Valentine, T.J., "Price expectations, partial adjustment and the sectoral demand for money in Australia", Journal of Money, Credit and Banking, 10 (1978), 290-307.
- Albon, R.P. & Valentine, T.J., "The sectoral demand for bank loans in Australia", The Economic Record, 53 (1977), 167-180.
- Valentine, T.J., "Price expectations in Australia: An alternative analysis", The Economic Record, 53 (1977), 390-404.
- *Allan, R.H. & Valentine, T.J., "An econometric analysis of deposit rates, security holdings and last-resort borrowing in the short-term money market", Australian Journal of Management, 3 (1978), 1-15.
- Hunt, B.F. & Valentine, T.J., "The interdependence of monetary policy and capital flows in Australia: A comment", The Economic Record, 54 (1978), 281-285.

† not a member of this university

* former member

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

FIRST SEMESTER

| Subject or Unit | Percentage of Number Enrolled | | | | Percentage of Number Sitting | | | | | | |
|--------------------|-------------------------------|---------|--------------------------|---------|------------------------------|---------------------|-------------|--------|-----------------------|-------|---------|
| | Enrolled as at 30.4.78 | Sitting | Wastage (i.e. 2-3) | Failure | Sitting | High Distinction | Distinction | Credit | Pass with Merit | Pass | Failure |
| A01 No. | 209 | 189 | 20 | 31 | 189 | 18 | 27 | 37 | - | 76 | 31 |
| % | (100) | (90) | (10) | (15) | (100) | (10) | (14) | (20) | | (40) | (16) |
| A03 No. | 134 | 111 | 23 | 23 | 111 | 8 | 14 | 19 | - | 47 | 23 |
| % | (100) | (83) | (17) | (17) | (100) | (7) | (13) | (17) | | (42) | (21) |
| B01 No. | 91 | 73 | 18 | 13 | 73 | - | - | - | 26 | 34 | 13 |
| % | (100) | (80) | (20) | (14) | (100) | | | | (36) | (47) | (17) |
| B01H No. | 9 | 7 | 2 | - | 7 | 2 | 3 | 1 | - | 1 | - |
| % | (100) | (78) | (22) | | (100) | (29) | (43) | (14) | | (14) | |
| B03H No. | 5 | 6 | - | - | 6 | - | 4 | 1 | - | 1 | - |
| % | (100) | (120) | | | (100) | | (66) | (17) | | (17) | |
| C01 No. | 7 | 5 | 2 | - | 5 | - | - | - | - | 5 | - |
| % | (100) | (71) | (29) | | (100) | | | | | (100) | |
| C01H No. | 2 | 2 | - | - | 2 | 1 | 1 | - | - | - | - |
| % | (100) | (100) | | | (100) | (50) | (50) | | | | |
| C03 No. | 33 | 33 | - | 1 | 33 | - | - | - | 13 | 19 | 1 |
| % | (100) | (100) | | (3) | (100) | | | | (39) | (58) | (3) |
| C03H No. | 6 | 5 | 1 | - | 5 | 1 | 2 | 2 | - | - | - |
| % | (100) | (83) | (17) | | (100) | (20) | (40) | (40) | | | |
| C06 No. | 10 | 13 | - | - | 13 | - | - | - | 5 | 8 | - |
| % | (100) | (130) | | | (100) | | | | (38) | (62) | |
| C06H No. | 12 | 6 | 6 | - | 6 | 2 | 4 | - | - | - | - |
| % | (100) | (50) | (50) | | (100) | (33) | (67) | | | | |
| C07 No. | 2 | - | 2 | - | - | - | - | - | - | - | - |
| % | (100) | | (100) | | | | | | | | |
| C08 No. | 10 | 9 | 1 | - | 9 | 1 | 1 | 5 | - | 2 | - |
| % | (100) | (90) | (10) | | (100) | (11) | (11) | (56) | | (22) | |

Does not include postgraduate students.

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

SECOND SEMESTER

| Subject or Unit | Percentage of Number Enrolled | | | | Percentage of Number Sitting | | | | | | | |
|--------------------|--------------------------------|-------------|--------------------------|------------|------------------------------|---------------------|-------------|------------|-------------------------------|-----------------------|------------|------------|
| | Enrolled as at Aug. 1978 | Sitting | Wastage (i.e. 2-3) | Failure | Sitting | High Distinction | Distinction | Credit | Pass with High Merit | Pass with Merit | Pass | Failure |
| A01 No. % | 167 (100) | 144 (86) | 23 (14) | 33 (20) | 144 (100) | 5 (3) | 20 (14) | 35 (24) | - | - | 51 (36) | 33 (23) |
| A02 No. % | 172 (100) | 159 (92) | 13 (8) | 24 (14) | 159 (100) | 10 (6) | 20 (13) | 36 (23) | - | - | 68 (43) | 24 (15) |
| B02 No. % | 32 (100) | 32 (100) | - | 6 (19) | 32 (100) | - | - | - | 2 (6) | 6 (19) | 18 (56) | 6 (19) |
| B02H No. % | 6 (100) | 3 (50) | 3 (50) | - | 3 (100) | 1 (33) | 1 (33) | - | - | - | 1 (34) | - |
| B03 No. % | 18 (100) | 17 (94) | 1 (6) | 7 (39) | 17 (100) | - | - | - | 2 (12) | 2 (12) | 6 (35) | 7 (41) |
| B03H No. % | 3 (100) | 2 (67) | 1 (33) | - | 2 (100) | - | - | 1 (50) | - | - | 1 (50) | - |
| B04 No. % | 31 (100) | 32 (103) | - | 2 (6) | 32 (100) | 1 (3) | 4 (13) | 10 (31) | - | - | 15 (47) | 2 (6) |
| CO2 No. % | 2 (100) | 2 (100) | - | - | 2 (100) | - | - | - | - | - | 2 (100) | - |
| CO2H No. % | 3 (100) | 3 (100) | - | - | 3 (100) | 1 (33) | 2 (67) | - | - | - | - | - |

THE AUSTRALIAN NATIONAL UNIVERSITY
 DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE
 SECOND SEMESTER

| Subject or Unit | Percentage of Number Enrolled | | | | Percentage of Number Sitting | | | | | | | |
|--------------------|--------------------------------|------------|--------------------------|-----------|------------------------------|---------------------|-------------|-----------|-------------------------------|-----------------------|------------|-----------|
| | Enrolled as at Aug. 1978 | Sitting | Wastage (i.e. 2-3) | Failure | Sitting | High Distinction | Distinction | Credit | Pass with High Merit | Pass with Merit | Pass | Failure |
| CO4 No. % | 16 (100) | 14 (88) | 2 (12) | 3 (19) | 14 (100) | - | - | - | - | 1 (7) | 10 (72) | 3 (21) |
| CO4H No. % | 4 (100) | 4 (100) | - | - | 4 (100) | - | 1 (25) | - | - | - | 3 (75) | - |
| CO5 No. % | 11 (100) | 10 (91) | 1 (9) | 2 (18) | 10 (100) | - | - | - | 2 (20) | 3 (30) | 3 (30) | 2 (20) |
| CO5H No. % | 9 (100) | 3 (33) | 6 (67) | - | 3 (100) | 2 (67) | - | 1 (33) | - | - | - | - |

Does not include postgraduate students.

| | <u>Enrolled</u> (as at 30.4.78.) | <u>Sitting</u> | <u>Results</u> |
|------------------------------|-------------------------------------|----------------|-------------------------------------|
| Final Honours | 3 | 2 | 1H2B, 1H2A |
| Masters Qualifying | 6 | 1 | 1 qualified, 1 deferred, 4 withdrew |
| Masters Degree by Coursework | 8 | 3 | 3 withdrew |
| Masters Degree | 4 | 2 | 1 MA |
| Ph.D | 12 | 1 | - |