THE AUSTRALIAN NATIONAL UNIVERSITY

FACULTY OF ECONOMICS

DEPARTMENT OF STATISTICS

ANNUAL REPORT 1976

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. Because of this structure the department finds particularly unwelcome the A.U.C. directive to hold constant the intake of new students into the university.

In March 1976 Council approved the establishment of the Department of Computer Science. The study of computing science, which began in 1970 with the appointment of two academic staff attached to the Statistics Department, is now organized to contribute fully to the future activities of the university.

In 1975 and again in 1976 the core second year unit, Statistics B01, was taught by a method of self paced instruction. Whilst this innovation has evoked interest on the part of both students and staff it has been decided to discontinue this style of teaching and to revert to the standard lecture/tutorial system in 1977. It may be instructive to report the major reason for this decision, namely the heavy demand on staff time, since it illustrates that in circumstances of straightened resources it may not be possible to continue a teaching program that appeared promising. The decision was made with regret but it is believed that the allocation of staff to the introduction of a Masters Degree by Coursework and the new unit Statistics C08 represent a more useful contribution to the discipline.

The Masters Degree by Coursework just referred to will be introduced on a part-time basis in 1977, the full range of options not being available until 1978. The course has been designed to have a bias towards applications but is for candidates with a reasonably advanced background, who can meet an Honours I or IIA entry requirement. Another new venture in 1977 is Statistics C08, a course dealing with the applied side of advanced statistical techniques in data analysis, with an emphasis on the use of computers. This course is intended for research workers who already have some familiarity with statistics.

The Departments of Statistics and Computer Science are carrying out investigatory work in computed aided instruction (C.A.I.). In 1976 a tutorial room has been equipped to allow the use in tutorial classes of the UNIVAC 1100/42 to illustrate some fundamental statistical concepts. This work will be continued in 1977 and will be supported by the appointment of an Assistant Programmer to coordinate and structure further developments in this area.

After providing a summer course in Statistics A03 for three years the Departmental Committee decided that it was no longer feasible to offer this service unit. This arrangement was begun as an experiment to gauge the interest of students in a course offered during the summer vacation. Unfortunately the numbers enrolling in this unit did not grow to a level which would support the staff resources required to meet the lecturing, tutorial and administrative load. Those staff closely involved with this course did report that the motivation of the students enrolled was excellent but there was a feeling that compressing the semester unit into a period of approximately six weeks did not allow sufficient time for students to properly absorb the material presented.

The staff and students in Econometrics gained a great deal from the presence of the stimulating group of overseas visitors to the Department, listed below the members of staff. It is hoped that in 1977 there will be an opportunity for several excellent visitors to again participate in the teaching and research activities of the Department.

The first three Working Papers in Econometrics

> P.K. Trivedi and A.R. Pagan, "Polynomial Distributed Lags: A Unified Treatment"
>
> M.R. Wickens, "Rational Expectations and the Efficient Estimation of Econometric Models"
>
> L.G. Godfrey and M.R. Wickens, "The Estimation of Incomplete Econometric Models"

will be circulated early in 1977 to individuals and institutions interested in econometric theory and applications both in Australia and overseas.

The program for the econometric seminar series in 1976 is set out below and is a clear illustration of the contribution made to this program by our overseas visitors, members of the Australian Bureau of Statistics, The Treasury and the Reserve Bank of Australia.

Seminars 1976

March 19th	H.N. Johnston and J. Spasojovic Australian Bureau of Statistics	The Portfolio Behaviour of Permanent Building Societies
April 2nd	P.B. Spahn Centre for Federal Financial Relations	What is econometric modelling about? Some experiences regarding the German economy.
April 23rd and May 21st	R. Kohn Statistics, S.G.S.	Identification in Linear Systems - A Synthesis
May 28th	A.D. Hall Statistics, S.G.S.	The Relative Efficiency of Estimators of Seemingly Unrelated Regressions.
June 11th	B. Bonyhady and C. Caton Treasury Department	The Saving Ratio.

Seminars 1967 (Cont.)

June 18th	M. Butlin Reserve Bank of Australia	Inflation Since Federation.
July 9th	A. Ullah University of Western Ontario	On Obtaining the Finite Sample Properties of the Estimators for Regression Coefficients and Structural Coefficients of Econometric Models.
July 23rd	D. Hendry London School of Economics	Modelling Consumer's Expenditure in the United Kingdom.
July 30th	G. Menges University of Heidelberg	Forecasting from a Decision – Theoretical Point of View.
August 2nd	S. Heiler University of Dortmund	A New Method for Analysing Economic Time Series.
August 13th	N. Kakwani University of N.S.W.	Applications of Lorenz Curves in Economic Analysis.
September 17th	A.D. Owen University of N.S.W.	The Jackknife Statistics – An Application in Econometrics.
September 24th	M.R. Wickens University of Essex	The Estimation of Incomplete Econometric Models.
October 1st	K.R. McLaren Monash University	The Optimality of General Pascal Distributed Lags.
October 8th	W.E. Griffiths University of New England	Bayesian Estimation of a Random Coefficient Production Function.
October 15th	N.H. Johnston and J.R. Perrin Australian Bureau of Statistics	The Portfolio Behaviour of the Official Short Term Money Market.
October 22nd	M.R. Wickens University of Essex	Rational Expectations and the Efficient Estimation of Econometric Models.

Research by members of the department was mainly in the fields of pure and applied probability (particularly limit theorems, branching processes and characteristic functions), 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 has been awarded to Dr Pagan and Professor Terrell to permit the construction of a data bank of economic time series. The proposers believe that such a data bank will assist the expansion of research work in applied economics by academic staff and postgraduate students throughout the university.

During his sabbatical leave, Dr E. Seneta has been continuing his research into "Linear Least Squares in Pre-Revolutionary Russia" supported by an A.R.G.C. Grant awarded for 1976.

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 organization and course content of a unit with all involved in teaching that unit.

Enrolments and Examination Results

Total enrolments in the Statistics Department at 30 April 1976 increased by 1.5% overall although the postgraduate contribution declined by 19.5% whereas the undergraduate numbers increased by 9%. The changes in postgraduate enrolments are rather volatile and it is quite likely that next year will see a reversal of this downward movement.

A table of comparative failure rates for students attempting final examinations is presented for the period 1972-1976 below.

Failure Rates, %

	Stats I	Stats II (Pass plus Honours)	Stats III (Pass plus Honours)	Operational Research
1972	17	15	3	17
1973	16	12	10	10
1974	17	16	8	16
1975	11	10	7	13
1976	14	7	8	6

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

The only significant feature of the failure rates seems to be the downward trend in failure rates in 2nd year Statistics (i.e. Statistics II). This has been particularly marked during 1975 and 1976 when the Keller plan has been in operation. It will be interesting to note the effect of discontinuing this form of teaching in 1977.

Final Honours students in Statistics achieved one H1 and one IIA. The third student's result has been deferred due to illness. The candidate who achieved H1 was also awarded a University Medal for his work in Economics and Econometrics.

Graduate Students

There are 12 students enrolled for higher degrees; eight for the Ph.D. and four for the Masters degree in Statistics.

Staff

Professor, Head of Department and Dean of Faculty	R.D. Terrell, B.Ec.(Adel.), Ph.D.
Professor	- C.R. Heathcote, B.A.(W.Aust.), M.A.(Melb.), Ph.D.
Reader	- E. Seneta, M.Sc.(Adel.), Ph.D.
Senior Lecturers	- S. John, B.Sc.(Trav.), M.Sc.(Kerala), Ph.D. (Indian Stat. Inst.)
	- J.H.T. Morgan, B.A.(Cantab.), M.Sc. (Case Inst. Tech.)
	- D.F. Nicholls, B.Sc.(New Eng.), Ph.D.
	- T.J. Valentine, B.Ec.(Syd.), M.A. (Princeton), Ph.D. (Princeton)
	- P. Winer, B.Sc.(Rand.)
Lecturers	- D.C. Chant, M.Sc.(Lond.), Ph.D.
	- T.J. O'Neill, B.Sc.(Adel.), M.S. (Stanford), Ph.D.(Stanford) (From 30.8.76)
	- A.R. Pagan, B.Ec.(Q'ld), Ph.D.
Lecturing Fellow	- A.D. Hall, B.Ec.(Adel.), M.Ec., Ph.D.(Lond.)
Tutors	- N. Frances MacNally, B.Sc.(Lond.)
	- J.D. Rickard, B.Sc.(W.Aust.), M.Sc.
Temporary Tutor	- W.T.M. Dunsmuir, ARMIT (Math.)(Melb.), FRMIT (Melb.), B.Sc.(La Trobe) (To 13.8.76)
Programmers	- Patricia N. McCarter, B.Sc.(W.Aust.)
	- J. Belinda Pearson, B.Sc.(Melb.), B.Ec.
Research Assistant	- Ellen M. Ward, B.A. (Fordham)

Visitors

Professor A. Ullah (University of Western Ontario) - June-August 1976.
Dr D.F. Hendry (London School of Economics) - June-September 1976.
Dr M.R. Wickens (University of Essex) - July 1976-January 1977 - Drapers' Co. Award.
Dr K.F. Wallis (London School of Economics) - September-December 1976.
Dr E.L. Porteus (Stanford University) - September 1976-May 1977.

Publications

Chambers[*], R.L. and Heathcote, C.R., "A Linear Model with Errors
Lacking a Variance I", The Australian Journal of Statistics,
Vol. 17, No. 3, 1975, 173-185.

John S., "Unbiased and Upper Critical Values of Mean Trace of
Multivariate Beta for Testing Difference of Two Covariance
Matrices or Several Mean Vectors", Manchester-Sheffield School of
Probability and Statistics Research Report (59/SJ/1), June 1976.

Nicholls, D.F., "The Efficient Estimation of Vector Linear Time Series
Models", Biometrika, 63, 1976, 381-390.

Hughes[*], P.J. and Seneta, E., "Selection equilibria in a multiallele
single-locus setting", Heredity, 35 (1975), 185-194.

Seneta, E., Regularly Varying Functions. Lecture Notes in Mathematics,
Springer-Verlag, Berlin. (112 pp.), 1976.

Dubuc[†], S. and Seneta, E., "The local limit theorem for the Galton-
Watson process", Annals of Probability, 4 (1976), 490-496.

Pentony[*], Susan J. and Seneta, E., "Partition of the genotypic variance
and mean fitness change for autopolyploids", Biometrische Zeitschrift
18 (1976), 301-311.

Seneta, E., "On a contribution of Cauchy to linear regression theory",
Annals de la Société Scientifique de Bruxelles, 90 (1976), 229-235.

Seneta, E., "Some supplementary notes on one-type continuous-state
branching processes", Zeitschrift für Wahrscheinlichkeitstheorie
und verwandter Gebiete, 34 (1976), 87-89.

Seneta, E., "On a functional equation with asymptotically unique
continuous solutions", Aequationes Mathematicae, 14 (1976), 457-459.
University of Waterloo. Birkhäuser Verlag, Basel.

Valentine, T.J., "Cyclical and Seasonal Movements in Profits in
Australia 1960-1973", Australian Economic Papers, Vol. 15, June, 1976,
pp.52-58.

Valentine, T.J., "The Demand for Deposits in the Australian Manufacturing
Sector", The Economic Record, Vol. 52, March, 1976, pp.69-81.

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* Former (student) members of Department.

† Not a member of this University.

THE AUSTRALIAN NATIONAL UNIVERSITY
DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

SECOND SEMESTER

Subject or Unit		Enrolled as at July 76	Percentage of Number Enrolled			Percentage of Number Sitting						
			Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Failure
A01	No.	179	156	23	28	156	8	17	32		71	28
	%	(100)	(87)	(13)	(16)	(100)	(5)	(11)	(21)		(46)	(18)
A02	No.	236*	205	31	26	205	9	19	41		110	26
	%	(100)	(87)	(13)	(11)	(100)	(4)	(9)	(20)		(54)	(13)
B02	No.	44	29	15	4	25				5	16	4
	%	(100)	(66)	(34)	(9)	(100)				(20)	(64)	(16)
B02H	No.	4	4	0	0	4	2	2				
	%	(100)	(100)	-	-	(100)	(50)	(50)				
B03	No.	31	24	7	4	24				6	14	4
	%	(100)	(77)	(23)	(13)	(100)				(25)	(58)	(17)
B03H	No.	15	13	2	0	13	4	3	3		3	
	%	(100)	(87)	(13)	-	(100)	(31)	(23)	(23)		(23)	
B04	No.	33	35	-2	4	35	2	6	11		14	2
	%	(100)	(106)	(-6)	(12)	(100)	(6)	(17)	(31)		(40)	(6)
C02	No.	2	0	2	0	0						
	%	(100)	-	(100)	-	-						
C02H	No.	5	5	0	0	5	1	4				
	%	(100)	(100)	-	-	(100)	(20)	(80)				

* Does not include M.A.D.E. qualifying students.

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

FIRST SEMESTER

Subject or Unit		Enrolled as at 30.4.76	Percentage of Number Enrolled			Percentage of Number Sitting						
			Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Failure
AO1	No.	288	246*	42	42	246	11	22	50		121	42
	%	(100)	(85)	(15)	(15)	(100)	(4)	(9)	(20)		(49)	(17)
AO3	No.	126	106	20	4	106	3	9	15		75	4
	%	(100)	(84)	(16)	(3)	(100)	(3)	(8)	(14)		(71)	(4)
BO1	No.	100	79	21	3	79				24	52	3
	%	(100)	(79)	(21)	(3)	(100)				(30)	(66)	(4)
BO1H	No.	12	8	4	0	8	6	1			1	
	%	(100)	(67)	(33)		(100)	(75)	(13)			(13)	
CO1	No.	4	3	1	0	3					3	
	%	(100)	(75)	(25)		(100)					(100)	
CO1H	No.	5	5	0	0	5	2	2	1			
	%	(100)	(100)			(100)	(40)	(40)	(20)			
CO3	No.	29	27	2	2	27				9	16	2
	%	(100)	(93)	(7)	(7)	(100)				(33)	(59)	(7)
CO3H	No.	3	3	0	0	3		1	1	1		
	%	(100)	(100)			(100)		(33)	(33)	(33)		
CO5	No.	11	11	0	0	11				3	7	1
	%	(100)	(100)			(100)				(27)	(64)	(9)
CO5H	No.	1	1	0	0	1	1					
	%	(100)	(100)			(100)	(100)					
CO7	No.	2	2	0	0	2					2	
	%	(100)	(100)			(100)					(100)	

* Does not include M.A.DEV.Ec. (Prelim.) students

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

SECOND SEMESTER

Subject or Unit		Enrolled as at July 76	Percentage of Number Enrolled			Percentage of Number Sitting						
			Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Failure
C04	No.	18	19	-1	1	19				6	12	1
	%	(100)	(106)	(-6)	(6)	(100)				(32)	(63)	(5)
C04H	No.	4	2	2	0	2	1	1				
	%	(100)	(50)	(50)	-	(100)	(50)	(50)				
C06	No.	9	5	4	1	5				2	2	1
	%	(100)	(56)	(44)	(11)	(100)				(40)	(40)	(20)
C06H	No.	1	1	0	0	1		1				
	%	(100)	(100)	-	-	(100)		(100)				

	Enrolled (as at 30.4.76)	Sitting	Results
Final Honours	3	3	H1, H2A, 1 deferred because of sickness
Masters Qualifying	8	5	3 - qualified 2 - fail 3 - withdrew
Masters Degree	4	-	NIL
Ph.D.	6	-	NIL