THE AUSTRALIAN NATIONAL UNIVERSITY

FACULTY OF ECONOMICS

DEPARTMENT OF STATISTICS

ANNUAL REPORT 1974

General Comments and Courses

The Statistics Department is concerned with teaching and research in mathematical statistics, econometrics, probability theory, operational research, and also computer science. Unlike the situation in other Australian Universities the department is responsible for teaching in these areas throughout the University and consequently caters for students with diverse backgrounds and interests.

A great deal of consideration has been given to all aspects of the Statistics Department's teaching program during 1974. As a result of these considerations experimental changes in course presentation will be introduced in both first and second year units in 1975. It is still however widely accepted that our courses should be presented in a semester framework.

The Department provided Statistics A03 - a mathematics course to improve students mathematical background for elementary statistics units - as a summer course for the first time in 1974. This course will again be presented in January and February of 1975 and the numbers accepted for 1975 have doubled. Statistics C05 - a third year course in applied econometrics - was given for the second time in 1974 and eighteen students successfully completed the pass and honours units.

In 1974 the full Computer Science Honours year was offered for the first time and four candidates successfully completed the year.

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, changing parameter regression, non-linear estimation methods, time dependent systems of equations, econometric model building and specification testing, picture processing and pattern recognition, adaptive control, numerical methods and interactive systems.

Dr C.C. Heyde and Dr E. Seneta have been continuing their investigations into the contributions to probability, statistics, demography, and social statistics of the French savant Ireneé Jules Bienaymé (1796-1878). A small book: "I.J. Bienaymé: Statistical Theory Anticipated" is expected to be completed in 1975. An invited paper: "Bienaymé", will be presented at the 40th Session (Warsaw) of the International Statistical Institute, September 1975.

Dr C.C. Heyde has been appointed Associate Editor of *Annals of Probability* and of *Mathematics of Operations Research*.

Mr E.O. Fajana from the University of Ibadan, Nigeria, visited the department for three months to use programs which are available here for estimating systems of consumer demand equations. The work is part of a Ph.D. thesis on Nigerian imports. Dr Byron will be visiting the University of Ibadan to lecture and examine Mr Fajana's thesis and to install the ANU Econometric Estimation Package on the University of Ibadan's IBM370 computer.

ARGC Grants for 1975 were awarded to Dr Byron, Professor Terrell and Dr Valentine.

The Departmental Liaison Committee, as such, was not a powerful influence on changes made in the presentation of courses and how they were to be assessed. However, a number of semester units had particularly active unit liaison groups and these did prove to be a valuable - though time consuming - innovation.

Enrolments and Examination Results

Total enrolments at 30th April 1974 showed a 21% increase in undergraduate Statistics units and postgraduate enrolments remained steady in Statistics. In Computer Science overall enrolments increased by 7.5%. This arose mainly from an increase in postgraduate enrolments with undergraduate numbers almost constant. A table of comparative failure rates for students attempting the final examinations is presented for the period 1967-1974 below.

Failure Rates, %

	Stats I	Stats II (Pass plus Honours)	Stats III (Pass plus Honours)	Operational Research	Computer Science I	Computer Science II
1967	33	29	0	-	-	-
1968	23	26	36	27	-	-
1969	18	25	6	9	-	-
1970	15	17	7	15	-	-
1971	18	20	8	3	7	-
1972	17	15	3	17	15	11
1973	16	12	10	10	17	9
1974	17	16	8	16	12	6

The figures for 1972, 1973 and 1974 were drawn from those semester units most closely approximating the old full year units.

There is no indication of any substantial change in the failure rates. The detailed figures on pages 6-10 reveal a pattern of lower failure rates in the second semester.

One Final Honours student obtained a H1 and the other H2A.

Graduate Students

There are eight students enrolled for higher degrees, six for the Ph.D. and two for Masters degrees.   In addition there is one staff candidate for the Ph.D.

Staff

Professor and Head of Department	- R.D. Terrell, B.Ec.(Adel.), Ph.D.
Professor	- C.R. Heathcote, B.A.(W.Aust.), M.A.(Melb.), Ph.D.
Readers	- R.P. Byron, M.Ec.(W.Aust.), Ph.D.(Lond.)
	- C.C. Heyde, M.Sc.(Syd.), Ph.D., D.Sc.
	- E. Seneta, M.Sc.(Adel.), Ph.D.
Senior Lecturers	- R.A. Jarvis, B.Eng.(W.Aust.), Ph.D.(W.Aust.)
	- S. John, B.Sc.(Trav.), M.Sc.(Kerala), Ph.D. (Indian Stat.Inst.)
	- B.P. Molinari, B.Eng.(W.Aust.), Ph.D.(Cantab.)
	- J.H.T. Morgan, B.A.(Cantab.), M.Sc.(Case Inst.Tech.)
	- D.F. Nicholls, B.Sc.(New Eng.), Ph.D.
	- R.B. Stanton, B.Eng.(NSW), Ph.D.(NSW)
	- T.J. Valentine, B.Ec.(Syd.), M.A.(Princeton), Ph.D.(Princeton)
	- P.Winer, BSc.(Rand)
Lecturers	- P.N. Creasy, B.Sc.(Adel.)
	- A.R. Pagan, B.Ec.(Q'ld), Ph.D.
Lecturing Fellow	- A.J. Hurst, B.Sc. B.E.(Adel.)
Senior Tutor	- A.Victoria Peterson, SCB(MIT), M.Sc.(Caltech.), Ph.D.(Caltech.)
Tutors	- P.D. Feigin, B.Sc.(Melb.)
	- C.W. Johnson, B.Sc.(Mon.)
Temporary Tutor	- D.C. Chant, M.Sc.(Lond.), Ph.D.
Programmer	- Patricia N. McCarter, B.Sc.(W.Aust.)
Research Assistants	- Ann Spurr, B.Com.(Melb.) (To 5/7/74)
	- Ellen Ward, B.A.(Fordham) (From 1/7/74)

Visitors

Professor Nagar
W. Magill

Publications

Chant, D.C. "On asymptotic tests of Composite Hypotheses in Non-standard Conditions", _Biometrika_, 61 (1974), 291-298.

Heyde, C.C. "An iterated logarithm result for autocorrelations of a stationary linear process, _Annals of Probability_, 2 (1974), 328-332.

Heyde, C.C. "Limit theory for stationary processes via approximating martingales", _Advances in Applied Probability_, 6 (1974), 196-197.

Heyde, C.C. "On estimating the variance of the offspring distribution in a simple branching process", _Advances in Applied Probability_, 6 (1974), 421-433.

Heyde, C.C. and Seneta, E. "Notes on"Estimation theory for growth and immigration rates in a multiplicative process"", _Journal of Applied Probability_, 11 (1974), 572-577.

Jarvis, R.A. "A General Purpose Hybrid Interface for a Minicomputer", _Simulation_, Vol. 22, No. 4, April 1974, pp107-112.

Jarvis, R.A. "Computer Controlled Scanning Optical Microscope", _The Microscope_, Vol.22, No.3, July 1974, pp.247-258.

Jarvis, R.A. "An Interactive Minicomputer Laboratory for Graphics, Image Processing and Pattern Recognition", _I.E.E.E. Computer_, Vol. 7, No. 10, Oct. 1974, pp49-60.

Jarvis, R.A. "The Simulation of Probabilistic Adaptive Global Optimisation Strategies", _SIMSIG Conference Proceedings_, 13-15 May 1974, pp132-145.

John, S. "On inferring the probability of misclassification by the linear discriminant function, _Annals of the Institute of Statistical Mathematics_, Vol.25, No. 2 1973, pp.363-372.

John, S. "Acceptability and Statistical Inference, _Biometrika_, (1974) 61,2, pp285-290.

Molinari, B.P. "Expressions for control and loss in least-squares tracking and smoothing", Institute of Electrical and Electronic Engineers, Transactions on Automatic Control, Ac-19 (2) (1974), pp146-147.

Pagan, A.R. "A Generalisation of the Treatment of Autocorrelation", _Australian Economic Papers_, 23 (1974), 267-281.

Seneta, E. "A Tauberian theorem of E. Landau and W. Feller", _Annals of Probability_, 1 (1973), 1057-1058.

Seneta, E. "An interpretation of some aspects of Karamata's theory of regular variation, _Publications de l'Institut Mathematique (Academie Serbe des Sciences)_ 15 (1973), 111-119.

Publications (Contd.)

Seneta, E. "On a genetic inequality, Biometrics, 29 (1973), 810-814.

Seneta, E. "A note on the balance between random sampling and population size. (On the 30th anniversary of G. Malécot's paper), Genetics, 77 (1974), 607-610.

Seneta, E. Regularly varying functions in the theory of simple branching processes, Advances in Applied Probability, 6 (1974), 408-420.

Galambos, J[3] and Seneta, E, "Regularly varying sequences, Proceedings of the American Mathematical Society, 41 (1973), 110-116.

Bojanić, R.[3] and Seneta, E. "A verified theory of regularly varying sequences, Mathematische Zeitschrift, 134 (1973), 91-106.

Golub, G.[3] and Seneta, E., "Computation of the stationary distribution of an infinite stochastic matrix of special form", Bulletin of the Australian Mathematical Society, 10 (1974), 255-262.

Heyde, C.C. and Seneta, E. "Notes on "Estimation theory for growth and immigration rates in a multiplicative process", Journal of Applied Probability, 11 (1974), 572-577.

Valentine, T.J. "The Demand for Very Liquid Assets in Australia", Australian Economic Papers, Vol.12, (1973), pp196-207.

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3 Not a member of this University.

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

FIRST SEMESTER

Subject or Unit		Enrolled as at 30.4.74	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.	281	277	4	57	277	8	24	44	-	144	57
	%	(100)	(99)	(1)	(20)	(100)	(3)	(9)	(16)		(52)	(20)
A03	No.	80	74*	6	14	74	2	4	5		49	14
	%	(100)	(92)	(8)	(18)	(100)	(3)	(5)	(7)		(66)	(19)
B01	No.	83	82	1	19	82				5	58	19
	%	(100)	(99)	(1)	(23)	(100)				(6)	(71)	(23)
B01H	No.	15	13	2	1	13	3	2	4		3	1
	%	(100)	(87)	(13)	(7)	(100)	(23)	(15)	(31)		(23)	(8)
B03	No.	7	7	0	0	7				5	2	0
	%	(100)	(100)			(100)				(71)	(29)	
B03H	No.	6	6	0	0	6	2	2	1		1	0
	%	(100)	(100)			(100)	(33)	(33)	(17)		(17)	
B04	No.	13	13	0	0	13	5	4	3		1	0
	%	(100)	(100)			(100)	(38)	(31)	(23)		(8)	
C01	No.	12	12	0	3	12					9	3
	%	(100)	(100)		(25)	(100)					(75)	(25)
C01H	No.	4	3	1	0	3		1	1		1	0
	%	(100)	(75)	(25)		(100)		(33)	(33)		(33)	
C03	No.	35	33	2	5	33				6	22	5
	%	(100)	(94)	(6)	(14)	(100)				(18)	(67)	(15)
C03H	No.	2	2	0	0	2	1	1				0
	%	(100)	(100)			(100)	(50)	(50)				

* Does not include M.Ag.Dev.Ec. (Prelim.) students.

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

SECOND SEMESTER

Subject or Unit		Enrolled as at July 74	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
AC1	No.	146	139	7	30	139	7	12	25		65	30
	%	(100)	(95)	(5)	(21)	(100)	(5)	(9)	(18)		(47)	(21)
A02	No.	209	203*	6	14	203	10	19	24		136	14
	%	(100)	(97)	(3)	(7)	(100)	(5)	(9)	(12)		(67)	(7)
B02	No.	28	26	2	3	26				7	16	3
	%	(100)	(93)	(7)	(11)	(100)				(27)	(61)	(12)
B02H	No.	5	5	0	0	5	2	1	2			0
	%	(100)	(100)			(100)	(40)	(20)	(40)			
B03	No.	22	21	1	0	21				3	18	0
	%	(100)	(96)	(4)		(100)				(14)	(86)	
B03H	No.	2	2	0	0	2	1		1			0
	%	(100)	(100)			(100)	(50)		(50)			
C02	No.	3	3	0	0	3				1	2	0
	%	(100)	(100)			(100)				(33)	(67)	
C02H	No.	2	2	0	0	2	1				1	0
	%	(100)	(100)			(100)	(50)				(50)	

* Does not include M.Ag.Dev.Ec. (Prelim.) students.

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DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

SECOND SEMESTER

Subject or Unit		Enrolled as at July 74	Percentage of Number Enrolled — Sitting	Wastage (i.e. 2-3)	Failure	Percentage of Number Sitting — Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Failure
CO4	No.	22	22	0	3	22				7	12	3
	%	(100)	(100)		(14)	(100)				(32)	(54)	(14)
CO4H	No.	1	1	0	0	1		1				0
	%	(100)	(100)			(100)		(100)				
CO5	No.	10	10	0	0	10				4	6	0
	%	(100)	(100)			(100)				(40)	(60)	
CO5H	No.	8	8	0	0	8		3	2		3	0
	%	(100)	(100)			(100)		(37)	(25)		(37)	

	Enrolled (as at 30.4.74)	Sitting	Results
Final Honours	2	2	1 H1, 1 H2A.
Masters Qualifying	5	-	4 - Withdrawn 1 Result not finalised
Masters Degree	2	-	-
Ph. D.	7	-	

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

COMPUTER SCIENCE

FIRST SEMESTER

Subject or Unit		Enrolled as at 30.4.74	Percentage of Number Enrolled			Percentage of Number Sitting						
			Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Fail
B01	No.	157	131	26	16	131	8	15	38		54	16
	%	100	83.4	16.6	10.2	100	6.1	11.4	29.0		41.2	12.2
C01	No.	22	16	6	1	16				6	9	1
	%	100	72.6	27.4	4.5	72.6				37.5	56.2	6.3
C01H	No.	14	13	1	0	13	2	9	1		1	0
	%	100	92.7	7.3	0	92.7	15.4	69.1	7.7		7.7	0

	Enrolled (as at 30 April 1974)	Sitting	Results
Final Honours	4	4	1 H1, 1 H2A, 2 H2B
Masters Qualifying	7	5	5 - Not Available (2 Withdrawn)
Masters Degree	1	-	-

THE AUSTRALIAN NATIONAL UNIVERSITY

DEPARTMENT OF STATISTICS ANALYSIS OF STUDENT PERFORMANCE

COMPUTER SCIENCE

SECOND SEMESTER

Subject or Unit		Enrolled as at July 74	Percentage of Number Enrolled			Percentage of Number Sitting						
			Sitting	Wastage (i.e. 2-3)	Failure	Sitting	High Distinction	Distinction	Credit	Pass With Merit	Pass	Fail
BO2	No.	81	76	5	8	76	5	8	23		32	8
	%	100	93.8	6.2	9.9	93.8	6.6	10.5	30.2		42.1	10.5
CO2	No.	11	10	1	1	10				1	8	1
	%	100	90.9	9.1	9.1	90.9				10.0	80.0	10.0
CO2H	No.	9	9	0	1	9	0	2	5		1	1
	%	100	100	0	11.1	100	0.0	22.2	55.5		11.1	11.1
CO3	No.	5	5	0	0	5				1	4	0
	%	100	100	0	0	100				20.0	80.0	0
CO3H	No.	4	4	0	1	4	1	1			1	1
	%	100	100	0	25.0	100	25.0	25.0			25.0	25.0