

# *Statistics in Economics*



*Edited by P. Holmes*

*for the  
Statistical Education  
Project 16-19*

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# ***Statistics*** ***in*** ***Economics***

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HODDER AND STOUGHTON  
LONDON SYDNEY AUCKLAND TORONTO



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# Statistical Education

## Project 16-19

This project, funded by the Leverhulme Trust, was based in the Department of Probability and Statistics at the University of Sheffield from 1981 to 1984. Its brief fell into two main phases. The first was to conduct a survey of the statistics being used in industry, commerce and government by employees starting work at the age of 19 or so without specialist statistical qualifications and also to carry out an analysis of the statistical content of the many user-subjects at GCE A level and BEC and TEC courses (as they then were). The second phase was to use this background evidence as the basis for producing teaching materials for use in courses to prepare students for work and also to use in specific subjects at A level.

The teaching material in each subject area was the responsibility of a working party consisting of teachers and other experts in that area. All draft materials were tested in schools and colleges and revised in the light of evaluation comments received.

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# Foreword

The aim of this book is to introduce the statistics needed in current A Level Economics courses. Unlike most such texts it raises the issues in an economic context so that the importance of the statistics for the economist can be seen more easily. Four major areas of economics, that are common to all courses, have been chosen to introduce the statistical ideas. All the data used are from the latest readily available sources so that true emphasis can be given to the economic implications of the statistical analysis. In all cases full details of sources are given so that teachers or students can readily update the data each year. The sources used are all easily accessible either within school and college libraries or local town libraries. They are not, of course, the only contexts in which statistical ideas arise and are useful; the aim is that the student should not only see how they are used in one context but also be able to use them in similar contexts.

The text can be used in many ways. It can be used directly within the economics course when the particular topics (consumer behaviour, population, national income and expenditure, unemployment) are being studied. In this case it includes all the statistical knowledge required and also introduces many of the ideas of economics – though the teacher will want to supplement this with the non-statistical aspects of these topics. An alternative use is with students doing A level or AS level courses in statistics when each chapter can be taken as a case study in the application of particular statistical techniques in economics. In this case the student sees that any successful applied statistician needs to know something about the field of application in drawing sensible conclusions and learns to do this in the economics context.

Through using this text we hope that students will see that a proper use of statistics can give a greater insight into the nature of economics and that the student will become a better economist.

## Photocopiable pages

Since it is clearly more important that students should spend more time on interpreting the statistics, and working out the economic implications, they should mainly be carrying out statistical calculations and drawing statistical graphs in order to obtain insight into the nature of these processes. To stop time being spent unnecessarily on the mechanics of drawing axes, deciding on suitable scales etc., certain items (mainly half-completed graphs and tables) are reproduced in photocopiable form at the back of the book. Copies of these pages (55 to 64) may be made for use by students within institutions using this book. Photocopiable items are denoted by the symbol  $\textcircled{P}$ .

P. Holmes  
1987

## Acknowledgments

Tables and diagrams from *Social Trends 1986*, *Family Expenditure Survey 1984*, *Annual Abstract of Statistics*, *UK National Accounts 1985*, *Department of Employment Gazette* and *National Accounts Statistics: Sources and Methods* are reproduced with the permission of the Controller of Her Majesty's Stationery Office. Data from the 1962, 1974 and 1984 *United Nations Demographic Yearbook* and the 1984 *Yearbook* are copyright United Nations and reproduced with their permission. Tables from *Population Trends 5*, Autumn 1976 (HMSO, 1976) are Crown copyright 1976, from *Population Trends 26*, Winter 1981 (HMSO, 1981) are Crown copyright 1981, and from *Population Trends 43*, Spring 1986 (HMSO, 1986) are Crown copyright 1986.

# *Summary of Statistical Ideas Introduced and Used*

Topic	Chapter	1	2	3	4	Topic	Chapter	1	2	3	4
Use of Official Statistics		×	×	×	×	Plotting time series			×	×	×
Sources of data		×	×	×	×	Reading time series graphs			×	×	×
Accuracy of published data		×		×		Age distribution			×		
Some difficulties of data collection		×		×		Population pyramids			×		
Rounding errors			×			Multiple bar charts			×		
Population censuses			×			Compound bar charts			×		×
Identifying appropriate measures		×		×	×	Pie charts				×	
Practical problems in statistical measurement		×		×		Describing distributions			×		×
Industrial classification			×			Percentages		×		×	×
GNP and GDP				×		Cumulative frequencies		×			
The importance of definitions when interpreting data		×		×	×	Medians		×			
Identifying simple statistical relationships		×	×		×	Percentiles		×			
Simple and more sophisticated modelling				×		Mean (average)					×
Reading and simplifying tables of data		×	×	×	×	Birth-rate			×		
Representative samples		×				Death-rate			×		
Sampling error		×				Growth-rate			×		
Independence				×		Under and over-population			×		
Estimates		×	×	×	×	Index numbers				×	
Accuracy of estimates		×	×	×	×	General Index of Retail Prices				×	
Bar charts		×	×		×	Costing in real terms				×	
Line graphs		×	×			Outliers					×
Histograms		×			×	Regression					×
Scatter diagrams		×			×	Simple trends		×	×	×	×
						Moving averages			×		×
						Seasonal adjustments					×
						Semi-average line					×
						Least squares line					×
						Making projections			×		×
						Quantifying costs					×



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