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CHAPTER 1

We begin by introducing statistics, understanding its meaning and scope as a subject—as a discipline. And conclude with a brief on a few other related issues.

1.1. Statistics Defined

Statistics, as a word, connotes two different meanings when seen as a singular and as a plural. In that sense, the distinction between the two meanings is interestingly interwoven.

A layman knows statistics as data. For him, it generally means numerical information expressed in quantitative terms. Obviously, it is when seen as plural that statistics refer(s) to data, data of all types. With the various types of data discussed here in Sec. 1.7, it is important to bear in mind that all data are statistical data.

Importantly, the more we think of data, the more are there to list and record. These may relate to objects, subjects, activities, phenomena, or regions of space. As a matter of fact, data have no limits as to their reference, coverage, and scope. It is, however, pertinent to cite a few more friendly cases to show that statistics are data, and data are statistical data.

- concerned official agencies on a regular basis.
- as an officially sponsored endeavour.
- are the product of a one-time effort and have limited use beyond the situation that may have called for their collection.

A student, on the other hand, knows statistics more intimately as a singular when it means a subject of study like economics, mathematics, chemistry, physics, and others. It is a discipline which scientifically deals with data, and is often described as the science of data. In dealing with statistics as data, statistics has developed appropriate methods of collecting, presenting, summarizing, and analysing data, and thus consists of a body of these methods. As these elements define the essential scope of statistics, we shall go into each of these separately as we proceed further.

1.2 Meaning Restated

Returning to statistics as data, no exercise involving data compilation and collection takes place without an objective. During ancient times, the objective was limited to maintaining the records of revenue collected through tax than to anything else. Collecting data specifically for understanding and analysing problem situations and using the results for taking appropriate decisions was seldom thought of. Consequently, the scope of statistics as a subject had been limited for long only to collection, compilation, and reporting of official data.

With the passage of time, both the objectives and, relatedly, the scope of data collection have undergone immense change. This owes to the philosophy of welfare state overtaking governance and, consequently, governments assuming more of the managerial role. In this new role, the state, directly and through its agencies specifically established for the task, collects variety of data on regular basis and with definite objectives.

Defining Statistics Scope and Related Issues

1. At the macro level, there are data on gross national product with break-up into shares of agriculture, manufacturing, and services. Also on distribution of national income as wages for labour, rent for land, profit for the entrepreneur, and interest for capital. Similarly, there are vast statistics available on savings and expenditure, investment by sectors or activity, production and prices, exports and imports, and so on. All these data are systematically compiled by the

2. At the micro level, individual firms, howsoever small or large, produce extensive statistics on their operations. The annual reports of companies contain variety of data on sales, production, expenditure, inventories, capital employed, and other activities. Huge statistics are available even at the household level, all purposely and deliberately collected

3. Abundant statistical data also get generated through specific-purpose research studies undertaken at different levels. These data are often field data collected by employing scientific survey techniques. Unless regularly updated, such data

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	Odd numbe X unit:	-		Even number X unit: 1/2	
N	ΣX^2	ΣX^{a}	N	ΣX^2	ΣX^{a}
3	2	2	4	20	164
5	10	31	6	70	1,414
7	28	196	8	168	6,216
9	60	708	10	330	19,338
11	011	1.958	12	572	
		14 2 8 1		572	18,620
13	182	4,550	14	010	
15	280	9.352		910	105,742
17	408	17.511		1.360	206,992
19	570	30,666	18	1.938	374,034
21	770	50.666	20	2.660	634,676
		50 000	22	3.542	1,023,638
23	1.012	70.010			
25	1.300	79.918	24	4,600	1,583,320
27	1.638	121.420	26	5.850	2,364,570
29	2.030	178 542	28	7.308	3,427,452
31	2.480	255 371	30	8.990	4,842,014
21	2.400	356.621	32	10 912	6.689,056
33	2.002				
35	2 992	169,696	34	13.090	9,060,898
33 37	3.570	651.738	36	15.540	12,062,148
	4.218	861.690	38	18.278	15,810,470
39 41	4.940	1,125.332	40	21.320	20,437,352
41	5.740	1,415,332	42	24.682	26,689,874
43	6.662	1,834.291			
15	7.590	2,302.806	44	28.380	32,926,476
17	8.698	2,862.488	- 46	32.430	41,127,726
19	9.800	3,426.040	48	36.818	50,887,088
		5,420.040	50	41.650	62,416,690
1	11_050	1 207 200			
3	12.402	4,307,290	52	46.852	75,947,092
5	13.860	5,221.242	54	52.470	91,728,054
7	15.428	6,284,124	56	58,520	110,029,304
9	17,110	7,513,436	58	65.018	131,141,306
-	17,110	8,927.998	60	71,980	155,376,028

Odd number of years X unit: 1 year

Odd number of years $\sum X^2 = \frac{N(N^2 - 1)}{N(N^2 - 1)}$ $\sum X^4 = \frac{3N^2 - 7}{20} \sum X^2$ or $\nabla v^4 = 3N^5 - 10N^3 + 7N$

Table A-18 Values of ΣX^2 and ΣX^4 for Fitting Least Squares Trend Lines

Even number of years X unit: 1/2 year

Even number of years $\lambda T \left(\lambda T^2 + 1 \right)$

$$\sum X^{2} = \frac{N(N^{2} - 1)}{3}$$

$$\sum X^{4} = \frac{3N^{2} - 7}{5} \sum X^{2}$$
or
$$\sum X^{4} = \frac{3N^{5} - 10N^{3} + 7N}{16}$$

15

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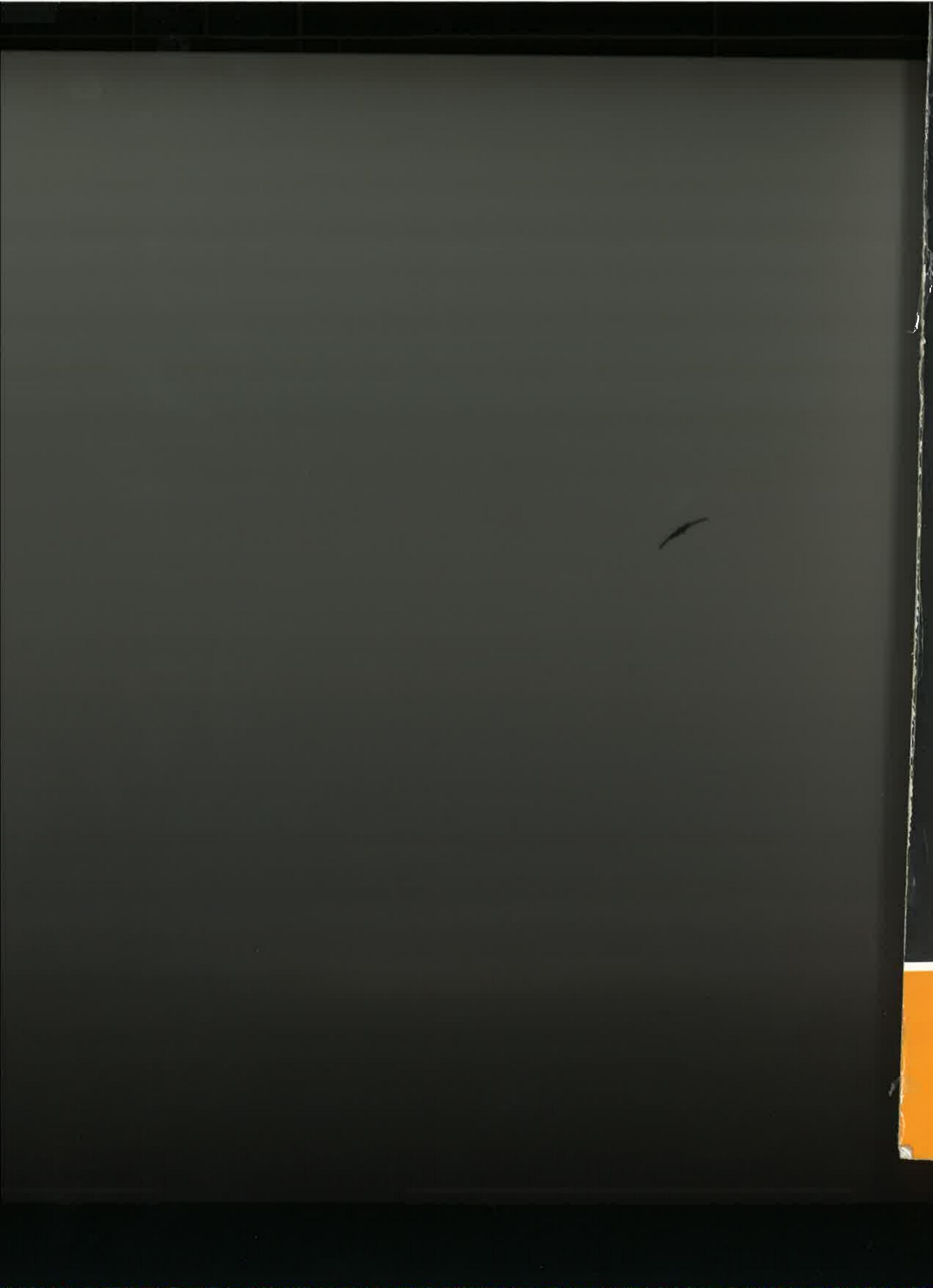
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FIFTH EDITION

STATISTICS FOR BUSINESS AND ECONOMICS

Statistics for Business and Economics is a comprehensive textbook on Statistics that caters to the 'needs of students doing a course of any level in the subject. As consumers and future managers, students are introduced to a range of methods of data collection and analysis that enable them to evaluate such data and analyse them to reach well informed decisions in various business settings. As a thorough and exhaustive text, supplemented by a large number of solved examples, it provides a firm grounding in the basics of Statistics. The step-by-step explanations and the logical progression of subject topics go a long way in simplifying the various concepts, methods, and problem-solving processes comprising the subject. The book exposes the entire subject matter in a manner that aids easy comprehension and basic learning of the subject even by those who have not studied it earlier. A large number of questions and exercises at the end of each chapter provide ample scope for practice and application of methods discussed in the book. Solutions to problems are provided in the CD that accompanies the book.

The book is useful for students of management, economics and commerce, in which Statistics is a core paper in almost all universities. It is also useful for those preparing for various competitive exams.

KEY FEATURES

- Simple and in reader-friendly language
- beginning facilitates easy understanding
- R P Hooda is an academician of merit. During his long career of 35 years, he has held with distinction a number of top academic and administrative positions. He remained Professor in the Department of Business Studies/Commerce, Kurukshetra University, for about 20 years and built up the Department as a Centre of Excellence as its Chairman for nine years. He held the offices of the Registrar, Dean Faculty of Commerce and Management, and Director, Directorate of Distance Education at Kurukshetra University. He was Director of Apeejay Institutions at their Dwarka Campus (New Delhi) for quite some time. On an earlier occasion, he also worked as Director, Academic Coordination at Indira Gandhi National Open University (IGNOU), New Delhi. Formerly the Vice-Chancellor of Kurukshetra University, he is now the Vice-Chancellor of Maharshi Dayanand University (MDU), Rohtak.

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• Large number of solved examples and practice questions

Introduction to notational and symbolic expressions in the

• Worked-out solutions to problems provided in CD

