

Chapter 5

Interval estimation and testing

5.1 INTRODUCTION

As stated earlier, the reason for taking a sample is to obtain information about the unknown characteristics of a population or process. Two types of population characteristics are of special interest in business: the mean of a variable, and the proportion of elements belonging to a category. After the sample has been taken, these are estimated by the corresponding sample mean and proportion. In the majority of studies in business, these estimates (there could be many of them in a typical marketing survey) are all that is required of the sample.

The key to good estimates lies in the *design* of the sample, and this takes place *before* the sample is actually selected. A well-designed sample, we have argued, should be: (a) *randomly selected* from the population or process of interest; and (b) *large enough* so that the estimates will have the desired degree of accuracy.

Interval estimates may be used in place of, or as a supplement to, the “point” estimates we have encountered up to now. Rather than state, after a sample is taken, that a population characteristic is estimated to be such-and-such a number, it may on occasion be more informative to state that the characteristic is estimated to be in such-and-such an interval. Not any arbitrary interval, obviously, will do. If we are to make interval estimates, we want assurance that our statement will be correct (that is, that the interval will contain the population characteristic) with a given probability. Such intervals are known as *confidence intervals* and are described in the following two sections.

The remainder of the chapter deals with *statistical tests*. A statistical test is a rule—a prescription, if you like—for deciding which of two statements concerning an unknown population characteristic is true. No decision rule (statistical or other) is infallible. The attractive feature of statistical tests is that they allow the decision-maker to *control* the probability of making an error judged (by the decision-maker) to be the more serious.