**Chapter 9 Summary**

In this chapter we considered three models, multinomial logit (MNL), conditional logit (CL), and mixed logit (MXL) models. Faced with several choices in a variety of situations, these models attempt to estimate the choice probabilities, that is, probabilities of choosing the best alternative, best in the sense of maximizing the utility or satisfaction of the decision maker.

In MLM the choice probabilities are based on individual characteristics, whereas in CLM these probabilities are based on choice-specific characteristics. In the MXL we incorporate both the individual and choice-specific characteristics.

All these models are estimated by the method of maximum likelihood, for these models are highly nonlinear.

Once these models are estimated, we can interpret the raw coefficients themselves or convert them into odds ratios, as the latter are easy to interpret. We can also assess the marginal contribution of regressors to the choice probability, although these calculations can sometimes be involved. However, statistical packages, such as *Stata*, can compute these marginal effects with comparative ease.

The main purpose of discussing these topics in this chapter was to introduce the beginner to the vast field of multi-choice models. The illustrative example in this chapter shows how one can approach these models. Once the basics are understood, the reader can move on to more challenging topics in this field by consulting the references. It is beyond the scope of this book to cover the more advanced topics. But we will discuss one more topic in this area, the topic of **ordinal** or **ordered logit** in the next chapter.

In closing, a warning is in order. The models discussed in this chapter are based on the assumption of IIA, *independence of irrelevant alternatives*, which may not always be tenable in every case in practice. Recall the “red bus, blue bus” example we discussed earlier. Although one can use the Hausman-type tests to assess IIA, they do not always work well in practice. However, there are alternative techniques to deal with the IIA problem, for which we refer the reader to the Long-Freese and Greene texts cited earlier.

To gain practice and be comfortable in the use of multinomial regression models, the reader may check the several data sets that are available on the websites of the books listed in the in the footnotes in this chapter.