**Chapter 3 Summary**

Qualitative, or dummy, variables taking values of 1 and 0 show how qualitative regressors can be “quantified” and the role they play in regression analysis.

If there are differences in the response of the regressand because of qualitative regressors, they will be reflected in the differences in the intercepts, or slope coefficients, or both of the various subgroup regressions.

Dummy variables have been used in a variety of situations, such as (1) comparing two or more regressions, (2) structural break(s) in time series, and (3) deseasonalizing time series and piecewise linear regression.

Despite their useful role in regression analysis, dummy variables need to be handled carefully. *First*, if there is an intercept in the regression model, the number of dummy variables must be one less than the number of classifications of each qualitative variable. *Second*, of course, if you drop the (common) intercept from the model, you can have as many dummy variables as the number of categories of the dummy variable. *Third*, the coefficient of a dummy variable must always be interpreted in relation to the reference category, that is, the category that receives the value of 0. The choice of the reference category depends on the purpose of research at hand. *Fourth*, dummy variables can interact with quantitative regressors as well as with qualitative regressors. *Fifth*, if a model has several qualitative variables with several categories, introduction of dummies for all the combinations can consume a large number of degrees of freedom, especially if the sample size is relatively small. *Sixth*, keep in mind that there are other more sophisticated methods of deseasonalizing a time series, such as the Census X-12 method used by the US Department of Commerce.