Fox Module 20 Collinearity

- Detecting collinearity
- Collinearity graphics

Read Section 13.1, “Detecting collinearity,” on pages 307-313. This section is graphics; there are no equations to know.

Fox mentions (in the introduction to this chapter) that collinearity is not a serious problem in social science research. The explanatory variables are characteristics that are usually orthogonal, such as sex, age, education, and residence.

In actuarial work, multicollinearity can be a serious problem. An actuary might regress a loss cost trend on wage inflation, medical inflation, and the CPI. The explanatory variables are highly correlated, and the regression equation may be useless.

Years ago, statisticians proposed corrections for multicollinearity: ways to form orthogonal dimensions from the available dimensions. These corrections were hard to use and often had little benefit. It is easier to (i) eliminate some explanatory variables or (ii) combine the explanatory variables into pre-set combinations.

Illustration: Regressing the workers’ compensation loss cost trend on both wage inflation and medical inflation causes multicollinearity problems. Instead, form an inflation index that is appropriate for workers’ compensation. If benefits are 55% medical and 45% indemnity, use 55% of medical inflation and 45% of wage inflation. Regress the loss cost trend on the new inflation index.

Know the two bullet points on page 308; you can skip the first paragraph on page 309, which is an advanced point that is not needed for this course.

Figure 13.3 on page 311 shows the concepts graphically. This figure is well drawn; spend few minutes to make sure it is clear.