

CHAPTER EIGHT: MULTICOLLINEARITY: WHAT HAPPENS IF EXPLANATORY VARIABLES ARE CORRELATED? 261

TABLE 8-4 AUXILIARY REGRESSIONS

$\ln X_2 =$	0.9460	–	0.8324 $\ln X_3$	+ 0.9483 $\ln X_4$	+ 1.0176 $\ln X_5$	
$t =$	(2.5564)		(–3.4903)	(5.6590)	(6.7847)	
						$R^2 = 0.9846$
$\ln X_3 =$	1.2332	–	0.4692 $\ln X_2$	+ 0.6694 $\ln X_4$	+ 0.5955 $\ln X_5$	
$t =$	(8.0053)		(–3.4903)	(4.8652)	(3.7848)	
						$R^2 = 0.9428$
$\ln X_4 =$	–1.0127	+	0.6618 $\ln X_2$	+ 0.8286 $\ln X_3$	– 0.4695 $\ln X_5$	
$t =$	(–3.7107)		(5.6590)	(4.8652)	(–2.2879)	
						$R^2 = 0.9759$
$\ln X_5 =$	–0.7057	+	0.6956 $\ln X_2$	+ 0.7219 $\ln X_3$	– 0.4598 $\ln X_4$	
$t =$	(–2.2362)		(6.7847)	(3.7848)	(–2.2870)	
						$R^2 = 0.9764$

Therefore, it is quite possible that in the regression (8.15) we did not find the coefficients of the pork and beef price variables individually statistically significant. But this is all in accord with the theoretical consequences of high multicollinearity discussed earlier. It is interesting that despite high collinearity, the coefficients of the real income and own-price variables turned out to be statistically significant. This may very well be due to the fact mentioned by Johnston in footnote 15.

As this example shows, we must be careful about judging the individual significance of an explanatory variable in the presence of a high degree of collinearity. We will return to this example in the following section when we consider remedial measures for multicollinearity.

8.8 WHAT TO DO WITH MULTICOLLINEARITY: REMEDIAL MEASURES

Suppose on the basis of one or more of the diagnostic tests discussed in Section 8.5 that we find a particular problem is plagued by multicollinearity. What solution(s), if any, can be used to reduce the severity of the collinearity problem, if not eliminate it completely? Unfortunately, as in the case of collinearity diagnostics, there is no surefire remedy; there are only a few rules of thumb. This is so because multicollinearity is a feature of a particular sample and not necessarily a feature of the population. Besides, despite near collinearity, OLS estimators still retain their BLUE property. It is true that one or more regression coefficients can be individually statistically insignificant or that some of them can have the wrong signs. If the researcher is bent on reducing the severity of the collinearity problem, then he or she may try one or more of the following methods, keeping in mind that if the particular sample is “ill-conditioned,” there is not much that can be done. With this caveat, let us consider the various remedies that have been discussed in the econometric literature.