Session 7: Review Exercises

AY2025/26 Term 1

Question 1:

(a) Suppose you wish to regress Y on variables X_1^k, X_2^k, X_3^k and X_4^g using instruments Z_4, Z_5, and Z_6 for the suspected endogenous regressor X_4^g. Suppose you have an iid sample

$$\{Y_i, X_{i1}^k, X_{i2}^k, X_{i3}^k, X_{i4}^g, Z_{i4}, Z_{i5}, Z_{i6}\}_{i=1}^n .$$

Referring to the matrix algebra form of the MM/2SLS/GMM estimator, how would you set up the X and Z matrix? What are the dimensions of these matrices?

(b) Derive the GMM estimator (Equation (8.21) from Econometrics Notes) from the GMM objective function given in Equation (8.20) from Econometrics Notes.

(c) Show that in the just-identified case, the GMM, MM, and 2SLS estimators all reduce to the same formula.