

updated: December 10, 2000; January 17, 2002 (minor correction on 4.6.3)

Hayashi *Econometrics*: Answers to Selected Review Questions

Chapter 4

Section 4.5

2. Even without conditional homoskedasticity, FIVE is consistent and asymptotically normal because it is a GMM estimator. It is not efficient because its choice of $\widehat{\mathbf{W}}$ is not efficient without conditional homoskedasticity.
3. They are numerically the same.
4. The hint is the answer.
5. This is so because \mathbf{x}_i is the union of all the regressors.
6. The SUR estimator with this expanded \mathbf{x}_i is numerically the same as the SUR estimator without *MED* in \mathbf{x}_i . Sargan's statistic will be numerically different. The degrees of freedom of its chi-square asymptotic distribution increase by two.

Section 4.6

1. The rank condition is violated if $z_{im1} = z_{im2} = 1$.
2. Not necessarily.
3. The efficient GMM estimator is (4.6.6) with $\mathbf{x}_{im} = \mathbf{z}_{im}$, $\widehat{\mathbf{W}}_{mh} = (m, h)$ block of $\widehat{\mathbf{S}}$ given in (4.3.2) (or (4.5.3) under conditional homoskedasticity) with $\mathbf{x}_{im} = \mathbf{z}_{im}$. It is not the same as pooled OLS unless the estimated error covariance $\widehat{\Sigma}$ happens to be spherical. It is not the same as the RE estimator because the orthogonality conditions used here are different from those used by RE.