

# Macro-econometrics: Notes on Week 3 Exercise

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## Some remarks:

- These notes will be posted on:  
<http://www.nuff.ox.ac.uk/Users/giese/Teaching.htm>
- As class teacher, I am your supervisor for Hilary and Trinity 2008 (and write reports). Please feel free to contact me if you have questions on the econometrics, the MPhil in general, and the thesis in particular.

## Notes on suggested solutions:

1. a) Deriving marginal and conditional distributions from bivariate joint normal should be revision from maths crash course. To find marginal distribution, solve  $f(y_t) = \int_{-\infty}^{\infty} f(y_t, z_t) dz_t$ . Once you know both joint and marginal distributions, you can find conditional by using Bayes Law:  $f(y_t|z_t) = \frac{f(y_t, z_t)}{f(z_t)}$ . Substitute both distributions and simplify.  
d) Two conditions for weak exogeneity:
  - i.  $(\gamma, \beta)$  must be a function only of the parameters in the conditional model  $(\phi)$ .
  - ii. Parameters in conditional model  $(\phi)$  must be variation free from parameters of marginal model  $(\Theta_z)$ , i.e. parameters in  $\Theta_z$  do not impose restrictions on  $\phi$ .The first condition is satisfied as  $(\gamma, \beta)$  only appear in  $\phi$ . But for the second condition, need  $\beta = \frac{\sigma_{yz}}{\sigma_{zz}}$  as otherwise  $(\gamma, \beta)$  depend on  $(\mu, \lambda)$ .
2. a) Think carefully about what you are asked to model, and what properties the individual time series have. For example, it would make sense to model the difference of *log* nominal wages as we can interpret these in terms of percentage changes. Explain what transformations you are doing!  
d) Think about which sample to look at. The model for sub-sample 1861-1913 was more promising and may improve even further with dynamics, while is not the case for whole sample. Make sure you include lags of *both*  $\Delta w_t$  and  $Ur^{-1}$ . Only lags of the unemployment rate inverse are unlikely to help as it is auto-regressive lags that typically improve fit.