Macro-econometrics: Notes on Week 1 Exercise

Julia Giese
Julia.Giese@Nuffield.ox.ac.uk

Some remarks:

- The exercises will prepare you for what to expect in the exam, but exams are marked by examination committee, **not** the class teachers.
- Therefore, the grades on your assignments should be taken tentatively, and reflect your progress over the term, rather than expected exam performance.
- For good grades, it is essential that you state assumptions, derive results carefully and explain what you are doing.
- The **empirical** exercises are important and **examinable**! Most of the time, we won't have time in the class to go through them in detail on the computer, so it is essential that you attend the computer classes and do the assignment (so you can get feedback through marking).
- 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)
   - The infinite geometric progression argument is only valid if $|\alpha| < 1$ and $t \to \infty$. This should be stated between Equations (3) and (4). If the question does not assume stationarity, it is 'safer' to derive mean and variance the long way, i.e. through recursive substitution. To derive time-invariant result, clearly state assumptions.
   - The ϵ_{t-h-i} in the first line of the autocovariance function (Equation (15)) should be squared, i.e.

$$\gamma(h) = \alpha^h E(\epsilon_{t-h}^2) + \alpha^{h+2} E(\epsilon_{t-h-1}^2) + \alpha^{h+4} E(\epsilon_{t-h-2}^2) + ...$$

   d) The OLS formula for $\hat{\alpha}$ in the question assumes that $\nu = 0$. It is quite a good exercise to derive the estimators including a constant, though.

   e) The distribution for y_0 in the question should read $N\left(0, \frac{\sigma^2}{1-\alpha^2}\right)$.

2.
   - You need to carefully explain what you are showing on graphs and what conclusions you draw from the analysis. Just submitting graphs is not enough.
   - Note that double differencing refers to the difference of the first difference, and not the difference between t and $t-2$.
   - Univariate auto-regressive models in levels typically fit much better, as they are less variable and are very persistent. But issues once extend analysis to include more variables: non-sense results (to be discussed over next few weeks).