DAR model notes

**The DAR(p) model**

**The DAR(1) model**

fff

Normal form,

Expanded form,

**Forecasting**

Since the DAR model contains an ARCH process, an analytical solution of the -step forecast is only obtainable for (also ???). This is done using forward recursion. Longer forecast horizons than cannot be derived analytically since XXX. But can be obtained using Monte Carlo (bootstrap) methods. We will only consider -step forecast.

Let denote the information set at time . Assuming that the random innovation follows a standard normal Gaussian (maybe student-t???), then and , as is not contained in . The optimal 1-step forecast is given by the conditional mean,

Since is contained in the information set, . Also, is independent of , so the expectation over the product is equal to the product of the two expectations,

Since is contained in the information set, ,

Theoretically, in expectation. However, in practice can be modelled auxiliareliry as a Moving Average (MA) process based on the lagged realised innovations. Let be a MA() process,

Then the -step forecast of the MA() process can be derived as,

Since is not contained in the information set, then . The past innovations are observed and can be derived by filtering the estimated DAR() residuals,, with the fitted ARCH() process,, such that . The auxiliary forecast of the innovation process becomes,

By assumption . However, the MA() structure might be able to absorb unwanted autocorrelation in the innovation process. Therefore, the -step forecast of the DAR() model, , is given by,

**DAR-MA(1)**:

Together,

Assuming MA(1),

Correspondonly for ,

One 1-step forecast,

Given is not contained in the information set , our best guess of the expected value is . Thus,

Since ,

Since , then by definition,

Inserting yields an expression of the 1-step forecast solely as a funciton of and ,

Model paramters

This can be generalised to a MA() process…,

Idea… is it legal?

New standardised residuals,

Isolate … then