Econ 226, Spring 2015

Answers to midterm exam

1a.) $\mathbf{x}_{t-1} = (\mathbf{y}'_{t-1}, \mathbf{y}'_{t-2}, ..., \mathbf{y}'_{t-p}, 1)'$, $k = np + 1$

b.) $\boldsymbol{\Omega}$ is $(n \times n)$. ε_{1t} is the error we would make in forecasting y_{1t} on the basis of a linear function of $\mathbf{x}_{t-1}$ and the (1,1) element of $\boldsymbol{\Omega}$ is the variance of this forecast error.

c.) The prior for the first element of $\mathbf{b}_i$ has variance $\omega_{ii}m_{11}$. Bigger values of m_{11} correspond to less confidence in this prior. If we had an earlier sample m_{11} would represent the (1,1) element of $\left(\sum_{\tau=1}^{\tilde{T}} \mathbf{x}_{\tau-1}\mathbf{x}'_{\tau-1}\right)^{-1}$ for this sample.

d.) $\mathbf{m}_1 = (1, 0, 0, ..., 0)'$

e.) Advantages: (1) if based on an earlier sample would have this form; (2) if prior is in this class, then so is the posterior; (3) if prior is in this class, then posterior is known analytically. Disadvantages: Assumes that the ratio of the variance of my priors for the first to the second elements of $\mathbf{b}_1$ is proportional to the ratio of the variance for the first and second elements of $\mathbf{b}_2$. This rules out for example the variances recommended by the Minnesota prior.

2a.) $h(\boldsymbol{\theta}) = p(\mathbf{Y}|\boldsymbol{\theta})p(\boldsymbol{\theta})$

b.)

$$\hat{E}(\boldsymbol{\theta}|\mathbf{Y}) = \frac{\sum_{m=1}^{M} \boldsymbol{\theta}^{(m)}\omega^{(m)}}{\sum_{m=1}^{M} \omega^{(m)}}$$

$$\omega^{(m)} = \frac{h(\boldsymbol{\theta}^{(m)})}{g(\boldsymbol{\theta}^{(m)})}$$

c.) $E(\boldsymbol{\theta}|\mathbf{Y}) = \int_{\aleph} \boldsymbol{\theta} p(\boldsymbol{\theta}|\mathbf{Y}) d\boldsymbol{\theta}$ exists, $p(\boldsymbol{\theta}|\mathbf{Y}) = kp(\mathbf{Y}|\boldsymbol{\theta})p(\boldsymbol{\theta})$, and support of $g(\boldsymbol{\theta})$ includes $\aleph$

d.) No, there are no initial conditions or serial dependence of this procedure

e.) (1) Make sure get the same answer when M increases; (2) make sure get the same answer when use different $g(.)$; (3) Try on special case where answer is known analytically.