Exercise 9

Due Monday, May 6

- Validating a Proposed Leading Indicator by means of an Out-of-Sample Forecasting Experiment
- The VAR Model (Vector Autoregressions.pdf)
  - Choice of Equal Lag Length m
  - System-wide AIC and SBC Goodness-of-Fit Measures
- Granger-Causal Testing – a RVAR
- The Series M Data Set (BJ_M_ Series.sas; VARMAX1.sas; VARMAX4.sas; VARMAX5.sas; M_Horserace.sas)
- Diebold-Mariano Test of Significant Differences in Forecasting Accuracies

Let $d_t = e_{t1}^2 - e_{t2}^2$ or $d_t = |e_{t1}| - |e_{t2}|$

where $e_{t1} = y_t - \hat{y}_t^{(1)}$ and $e_{t2} = y_t - \hat{y}_t^{(2)}$

with $\hat{y}_t^{(1)}$ representing the out-of-sample forecast from method 1 and $y_t^{(2)}$ representing the out-of-sample forecast from method 2. If we let the first method be the B-J method (the benchmark) and the second method being the VAR with both the target variable, y_t, and proposed leading indicator in it then we would expect $E(d_t) > 0$. But d_t may be autocorrelated so Diebold and Mariano suggest that we model d_t as an ARMA(p,q) model and then test

$H_0: \mu = 0$ (no significant difference in the MSE of the two methods, i.e. the leading indicator, x_t, is not potent (useful)

$H_1: \mu > 0$. (one tailed test).