1. Perform the ADF test to confirm that the three variables are stationary.

Texto

Descripción generada automáticamente

We can reject the null hypothesis on all three variables, meaning that they are indeed stationary.

1. Using the *varsoc* command and diagnostic checks on the residuals, determine the optimal lag length for the VAR model.

Interfaz de usuario gráfica

Descripción generada automáticamente

We run this command with 10 lags and discover that the optimal number of lags could be 8 (represented by the \* in the LR column) or 6 using the Akaike Information Criteria.

1. Estimate the reduced form var model using the number of lags chosen and run all the possible Granger causality tests.

Pantalla de computadora con letras

Descripción generada automáticamente con confianza media

All variables are jointly significant but just some lags are (omitted output for simplicity).

And running the Granger causality tests:

Tabla

Descripción generada automáticamente

We can see that *dlrgdp* granger causes *dlrinv*, and all the variables granger cause *dlrgdp*. No variables granger cause *dlrcons*.

1. Suppose we are interested to see:
   1. How the growth rate of consumption responds to a one time positive shock in the growth rate of income.

Texto

Descripción generada automáticamente



A shock in income has an immediate impact on consumption but dies out eventually. This could show the permanent income hypothesis.

* 1. How the growth rate of investment responds to one-time positive shock in the growth rate of consumption.





Here we can see a shock in consumption elevates investment but not immediately, then it dies out.

1. //TODO