

Homework 8

Eco 4306 Economic and Business Forecasting
Spring 2019

Due: slides on May 5, 11am; presentations will take place on May 6

Problem 1

Get the `q_gdp.wf1` workfile from in [hw08.zip](#), This workfile contains the following quarterly time series: U.S. real GDP `rGDPC` and GDP deflator `GDPDEF`, the average closing value of S&P 500 Index `SP500`. They were used to construct annualized quarter-over-quarter U.S. real GDP growth rate `d1rGDP` and inflation adjusted quarterly return of S&P 500 `d1rSP500`.

- Create two time series plots, one showing `d1rGDP` and one showing `d1rSP500`.
- Estimate a suitable univariate ARMA model for `d1rGDP` for the period 1990Q1-2016Q4.
- Use the ARMA model from (b) to create a fixed scheme forecasts for the period 2017Q1-2019Q2.
- Estimate a VAR with two endogenous variables '`d1rGDP`, `d1rSP500` for the period 1990Q1-2016Q4, use information criteria to select number of lags.
- Run Granger causality tests for both variables. What do the results suggest about the predictive power of the two variables? Discuss the economic intuition behind your results of Granger causality test.
- Use the VAR model from (d) to create a fixed scheme forecast for the period 2017Q1-2019Q2.
- Compare the RMSE for U.S. real GDP growth rate for the forecasts from (c) and (f).
- Compare your forecasts for U.S. real GDP growth rate in 2019Q2 with (1) the [Federal Bank of New York Nowcast](#), (2) the [GDPNow Federal Bank of Atlanta forecast](#), and (3) the minimum, the average, and the maximum forecasts in the [Wall Street Journal Economic Forecasting Survey](#).

Problem 2

Get the `m_ppi.wf1` workfile from [hw08.zip](#), This workfile contains the following monthly time series: Producer Price Index `PPI` and Brent Crude Oil Price `BRENT`.

- Create two time series plots, one showing `PPI` and one `BRENT`.
- Estimate a suitable univariate ARMA model for `dlog(PPI)` for the period 1980M1-2010M12.
- Use the ARMA model from (b) to create a fixed scheme forecasts for `PPI` in the period 2011M1-2018M12.
- Estimate a VAR model with two endogenous variables `dlog(PPI)`, `dlog(BRENT)` for the period 1980M1-2010M12, use Schwarz information criteria (SC) to determine the number of lags to be used.
- Run Granger causality tests for both variables. What do the results suggest about the predictive power of the two variables? Discuss the economic intuition behind your results of Granger causality test.
- Use the VAR model from (d) to create a fixed scheme forecast for the period 2011M1-2018M12.
- Compare the RMSE for Producer Price Index `PPI` forecasts from (c) and (f).

Problem 3

Get the `q_hpi.wf1` workfile from [hw08.zip](#). This workfile contains the following quarterly time series: House Price Index for Dallas-Plano-Irving MSAD `DALLAS` and House Price Index for Sherman-Denison MSA `SHERMAN`.

- (a) Create one time series plots showing `SHERMAN` and `DALLAS` in the same chart.
- (b) Estimate a suitable univariate ARMA model for `dlog(SHERMAN)` for the period 1988Q1-2010Q4.
- (c) Use the ARMA model from (b) to create a fixed scheme forecasts for `dlog(SHERMAN)` in the period 2011Q1-2019Q1.
- (d) Estimate a VAR model with two endogenous variables `dlog(SHERMAN)`, `dlog(DALLAS)` for the period 1988Q1-2010Q4, use Akaike information criteria to determine the number of lags to be used.
- (e) Run Granger causality tests for both variables. What do the results suggest about the predictive power of the two variables? Discuss the economic intuition behind your results of Granger causality test.
- (f) Use the VAR model from (d) to create a fixed scheme forecast for the period 2011Q1-2019Q1.
- (g) Compare the RMSE for `dlog(SHERMAN)` forecasts from (c) and (f).

Problem 4

Get the `m_gas.wf1` workfile from [hw08.zip](#). This workfile contains the following monthly time series: Brent Crude Oil Prices `OIL` and U.S. Regular Conventional Gas Price `GAS`.

- (a) Create two time series plots, showing `GAS` and `OIL`.
- (b) Estimate a suitable univariate ARMA model for `dlog(GAS)` for the period 1995M1-2010M12.
- (c) Use the ARMA model from (b) to create a fixed scheme forecasts for `GAS` in the period 2011M1-2019M4.
- (d) Estimate a VAR model with two endogenous variables `dlog(OIL)`, `dlog(GAS)` for the period 1995M1-2010M12, use Schwarz information criteria to determine the number of lags to be used.
- (e) Run Granger causality tests for both variables. What do the results suggest about the predictive power of the two variables? Discuss the economic intuition behind your results of Granger causality test.
- (f) Use the VAR model from (d) to create a fixed scheme forecast for the period 2011M1-2019M4.
- (g) Compare the RMSE for `GAS` forecasts from (c) and (f).