HARALD SCHMIDBAUER İstanbul Bilgi Üniversitesi

FM 431: Econometrics of Financial Markets

Fall 2009

PROBLEM SHEET # 5

Problem: File `export_germany.csv` contains a time series of the value (measured in 10^9 euros; converted to hypothetical euro values before January 1999) of monthly exports from Germany to other countries for the period January 1952 through July 2009. (The data source is *Deutsche Bundesbank*, http://www.bundesbank.de.) Let this series be denoted as (X_t), where t indicates the month.

a) Plot the following series: (X_t), $(\ln(X_t))$, $(X_t - X_{t-1})$, $(\ln(X_t) - \ln(X_{t-1}))$, using the R function `ts.plot`. (Convert the series into a time series object after reading it in.) Which of these series might be stationary?

b) Find a reasonably good ARIMA model for the series $(\ln(X_t))$. (Use the acf/pacf as a tool for model identification; use R functions `arima`, `summary` and `tsdiag`. — The AIC of your final model should be no larger than -2070.6.)

c) Based on the model you identified in (b), first forecast the logged export series for 24 months following July 2009, and then produce a forecast for the series of exports itself. Plot your forecast, together with the past time series values.