Economic Forecasting
Exercise Sheet 7

Richard G. Pierse

1. (a) Open the *EViews* file **klein1.wf1**, which contains the equations and data for Klein's Model 1 estimated on annual data from 1921 to 1941. Solve the model:

   (i) in single equation solution mode [*Fit (no eq interactions)*]

   (ii) in *static* solution mode [one step-ahead forecasts]

   (iii) in *dynamic* solution mode [multi-step forecasts]

   saving the forecast values for *consumption* from each solution. Graph forecast residuals (forecast value minus data) for the three solutions and compare them.

   Hint: The model is defined in the *model* object **klein**. Click on this object and select the *solve* tab. Make sure that simulation type is set to *deterministic*. The options you need to change are in the *dynamics* box. Select the appropriate option and click on the *Ok* button to start the solution. This will create a set of forecasts for each endogenous variable stored in new variables with the **_0** suffix. Note that each solution will overwrite the previous solution. Therefore to save the three solutions for *consumption* it is necessary to rename the **consumption_0** variable after each solution by right-clicking on the variable in the workfile window and selecting *rename* to give it a different (unique) name. Then you can generate forecast residuals as the difference between the saved forecast value and the actual data value for consumption.

   (b) Do a policy simulation showing the effect on the model of a increase in government expenditure (variable **gx**) of 5% above historical values for the period 1929-1941. Graph percentage changes from base for *production*.

   Hint: First you need to create an alternative series **gx_1** which is 5% above the original series. Generate a copy of the original series and then for the sample period 1929-1941 redefine it with the generate statement **gx_1=gx*1.05**. Now in the model window, select the *scenarios* tab and create a new scenario *Scenario 1*. Select this as the active scenario. Click the *overrides* tab and type in **gx**. This tells *EViews* that in solving *Scenario 1*, the exogenous variable *gx* is to be overridden by the values in *gx_1*. Finally, switch to the *solve* tab and, checking that solution mode is set to *dynamic* and active scenario to *Scenario 1*, click on the *Ok* button to run the policy simulation. The results will stored as new variables with the **_1** suffix. You can now generate percentage changes from base using the generate statement

prodpc=100*(production_1-production_0)/production_0.

(c) Do a control simulation to determine what government expenditure would have needed to be to have ensured that production grew by 5% over the period 1921-1941. Graph the solution path for *gov_expenditure* against the actual historical values

Hint: In order to be able to do this simulation in *EViews*, the model has been defined such that the variable *gov_expenditure* is specified as an *endogenous* variable equal to the value of the *exogenous* variable *gx*. Given this, we can solve in *EViews* for an adjustment (*add factor*) on the *gov_expenditure* equation that solves so that *production* is equal to the target path of 5% growth.

Firstly, we need to generate a variable **prodtar** to define the target growth path. First initialise new variable **prodtar** equal to **production**; then generate **prodtar** recursively over the period 1921-1941 using the generate equation **prodtar=prodtar(-1)*1.05**. Now we can define a new scenario in which we will find the *add factor* on the *gov_expenditure* equation that will solve the control simulation. First, select the *scenarios* tab in the *model* window and create a new scenario: *Scenario 2*. Select this as the active scenario. Then click on the *equations* tab, double click on the *gov_expenditure* equation and select the *add factors* tab. Make sure that *Scenario 2* is the active scenario and that *equation intercept (residual) shift* is the factor type. Then click the *initialise active add factor* button. In the new window select the *"So model solves the target variable"* option and enter **production** as the *target* variable and **prodtar** as the *trajectory* series. Click *Ok* twice to return to the *model* window and switch to the *solve* tab. Make sure that *Scenario 2* is the active scenario and click on *Ok* to start the simulation.

(d) Do a stochastic simulation of the model and graph the mean and upper and lower quantile bounds for *production*.

Hint: To do a stochastic simulation of the model, select the *Solve* tab in the model window and change the simulation type from *deterministic* to *stochastic*. Some new options will appear in the *scenarios and* *output* box. Make sure that the *standard deviation* and *bounds* boxes are both checked and that *baseline* is the active scenario. Then click on the *Ok* button to start the simulation. New variables will be created with suffix **_0m** for the simulation mean, suffix **_0s** for the simulation standard deviation and suffices **_0h** and **_0l** for the upper and lower quantile bounds respectively. To graph the mean and quantile bounds of production together, switch to the variables tab and double click on variable *production*. Select *mean and confidence bounds* from the scenario solutions list and click *Ok* then switch view to graph.