A Guide to Simulation with E-Views*

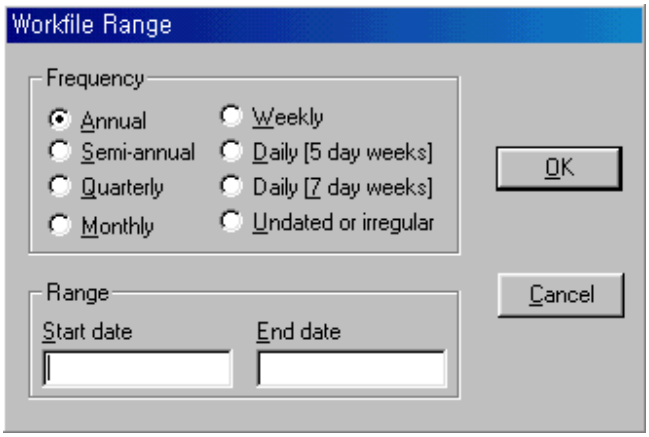
(Version 4.1)

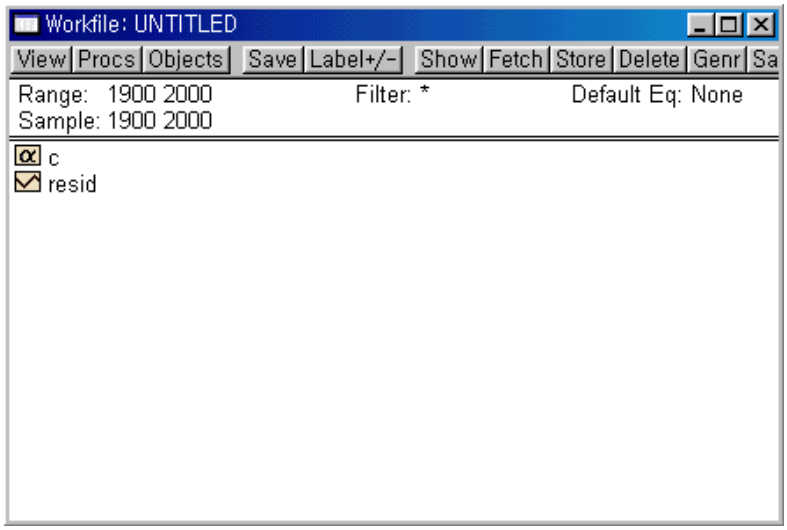
1. DEFINITION OF A SIMULATION IN EVIEWS

- A model in EViews is a set of simultaneous equations that are used for forecasting and simulation. Unlike other objects in EViews that contain systems of equations, models do not contain unknown coefficients to be estimated. Instead, models allow you to solve for unknown values for the endogenous variables.

2. CREATING A MODEL

- To create a model, click **File / New / Workfile** in the ***Main Toolbar***.
  - ✓ A ***Workfile Range*** window appears.
- Choose **Frequency**, **Start date** and **End date**
  - ✓ A ***Workfile****: Untitled* window appears with 2 items: (α) **C** and (✓) **RESID**





- Click **Objects / New Object / Model** in the ***Workfile*** toolbar. In the dialog that appears, type in a name for your model (say "EXAMPLE").
  - ✓ When you click OK, an empty ***Model Window*** should appear.

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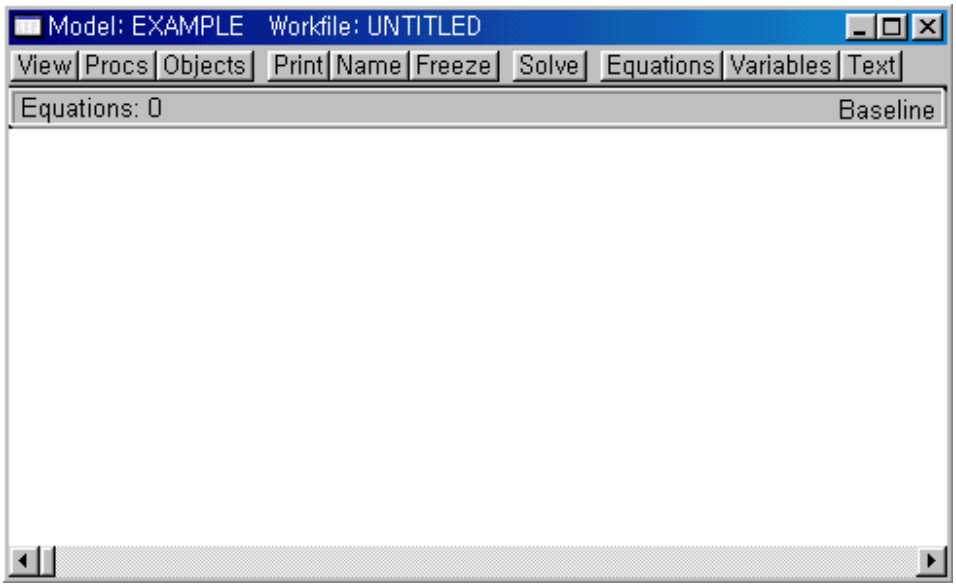
* The first version (E-Views Version 3.1) of this guide was written by Mathieu Lequain, University of Ottawa, and it was updated to the current version by Jung Hoon Kim, University of Ottawa. If you find any mistake or if you have any recommendation on this guide, please email to jkim068@uottawa.ca.



3. SPECIFYING A MODEL

3.1 Before Entering Equations

- The equations in a model can be behavioural **equations** or **identities**.
- The variable on the left of the equal sign is the **endogenous** variable that will be determined by the equation.

> ***NOTE*: Eviews does not distinguish capital letter, subscript or superscript. In other words B_{hs}^{N} is identical to BHSN for Eviews.**

- To enter an equation with *t lags*, we use the sign (-t) after the variable. For example we have

  Y=Y+Y(-1)+Y(-2)-Y(-1)-Y(-2).

- You can also use the command d(Y) which is equivalent to Y-Y(-1) .

  So Y=d(Y)+Y(-1)

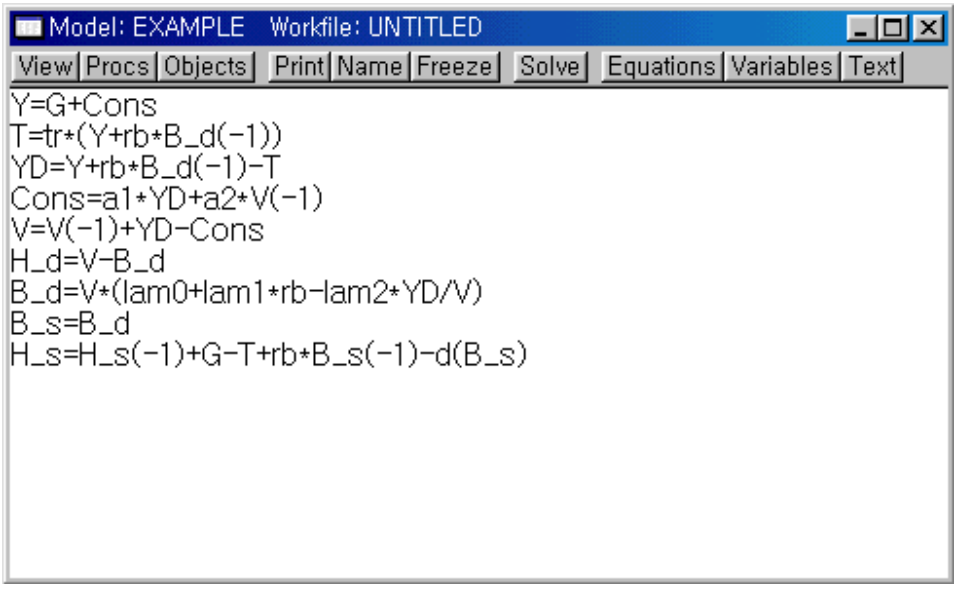
- In addition to the *behavioural* equations, some models may have identities that allow the model to be solved for the endogenous variables. **Before trying to solve the model, make sure that there are exactly as many equations in the model as there are endogenous variables to solve for. You must set up your equations so that each equation has a different endogenous variable as the first series on the left-hand**

side.

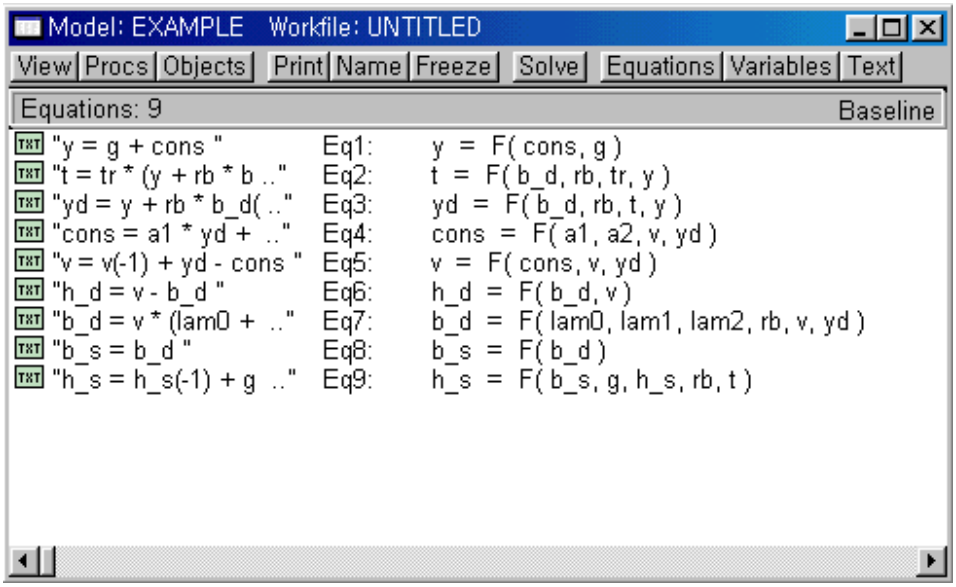
3.2 Entering Equations

- Click **View / Source Text** in the ***Model Window*** to enter equations. In the ***Model Window*** you can type your equations.
- As an example, a model in the ***Model Window*** looks like the following:

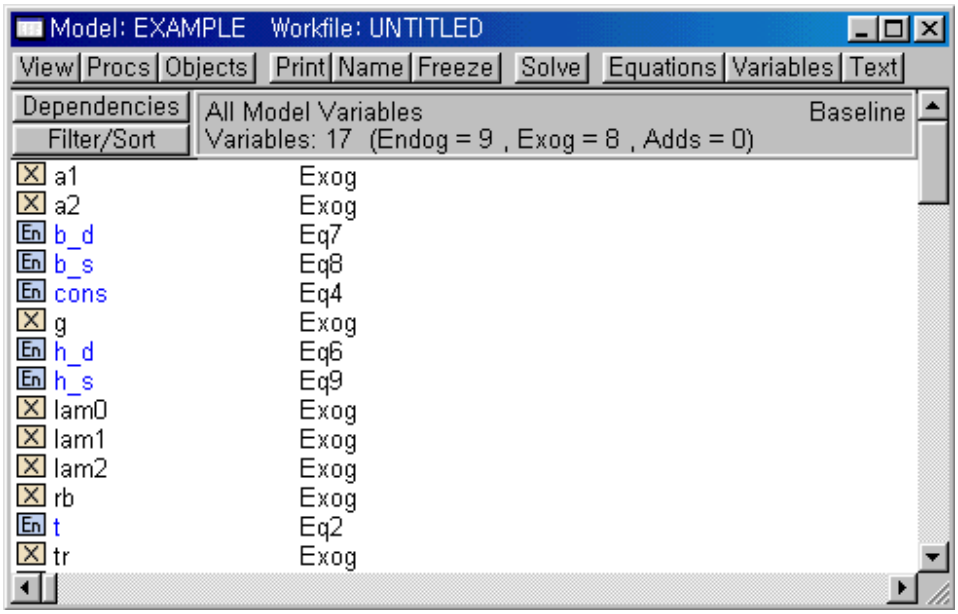
```
Y=G+Cons
T=tr*(Y+rb*B_d(-1))
YD=Y+rb*B_d(-1)-T
Cons=a1*YD+a2*V(-1)
V=V(-1)+YD-Cons
H_d=V-B_d
B_d=V*(lam0+lam1*rb-lam2*YD/V)
B_s=B_d
H_s=H_s(-1)+G-T+rb*B_s(-1)-d(B_s)
```



- To confirm whether the equations are correct, click **Equations** in the ***Model Window***. If you find wrong equations, click **Text** in the ***Model Window*** and correct the equations.



- The nine variables Y, T, YD, CONS, V, H_d, B_D, B_S, H_S on the left-hand side of each equation are the endogenous variables in this model. Note that the first equation is an identity, although the seventh is a behavioural equation. The exogenous variables that appear only on the right-hand side are G, TR, RB, a1, a2, lam0,lam1 and-lam2. (To confirm the endogenous and exogenous variables, click **Variables** in the ***Model Window***.)



EViews solves for the endogenous variables, given data for the exogenous variables and parameters.

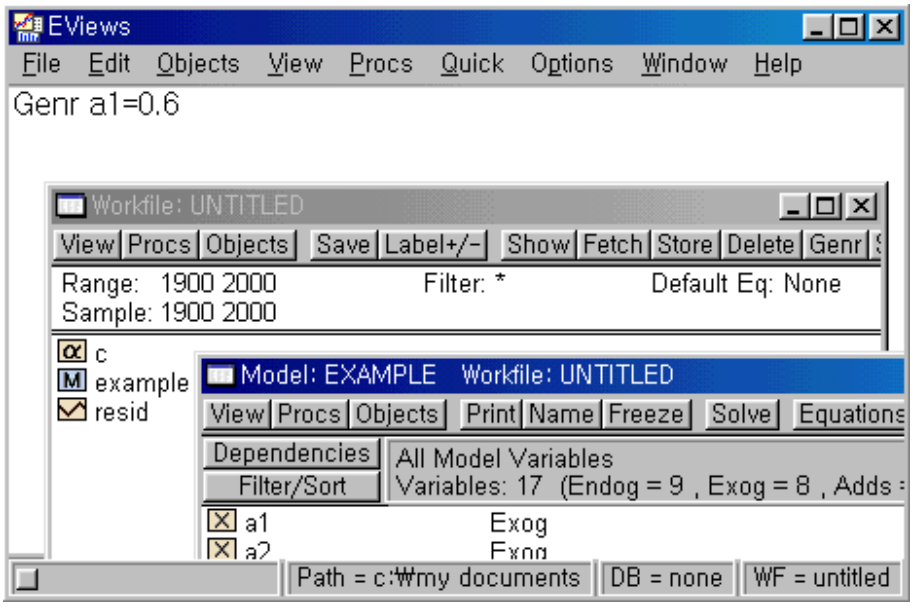
- After entering the equations, save the ***Workfile***. In the ***Main Toolbar***, click **File / Save**.

4. SOLVING MODELS

- Once you have specified the equations in the model, you ***must*** enter the **steady state values of endogenous and exogenous variables**.

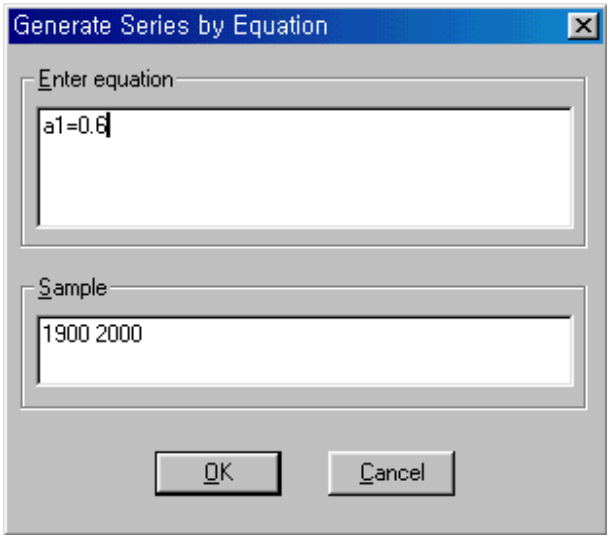
4.1 Entering your steady state values

- You have to generate each of the variables (**both endogenous and exogenous**) to be used in the model. Because you are working from the steady state, each variable is constant over time.
- In the upper box under the ***Main Toolbar*** (if you don't see this box, you need to minimize the ***Workfile Window*** and the ***Model Window***, but **DO NOT CLOSE THEM!!**), you can use the command GENR to generate each variable. After entering the value of a variable, press the Enter key.



```
Genr a1=0.6
Genr a2=0.4
Genr B_D=75.724
Genr B_S=75.724
Genr Cons=89.08
Genr G=20
Genr H_D=13.363
Genr H_S=13.363
Genr lam0=1.2
Genr lam1=5
Genr lam2=0.5
Genr rb=0.03
Genr T=22.272
Genr Tr=0.2
Genr V=89.08
Genr Yd=89.08
Genr Y=109.08
```

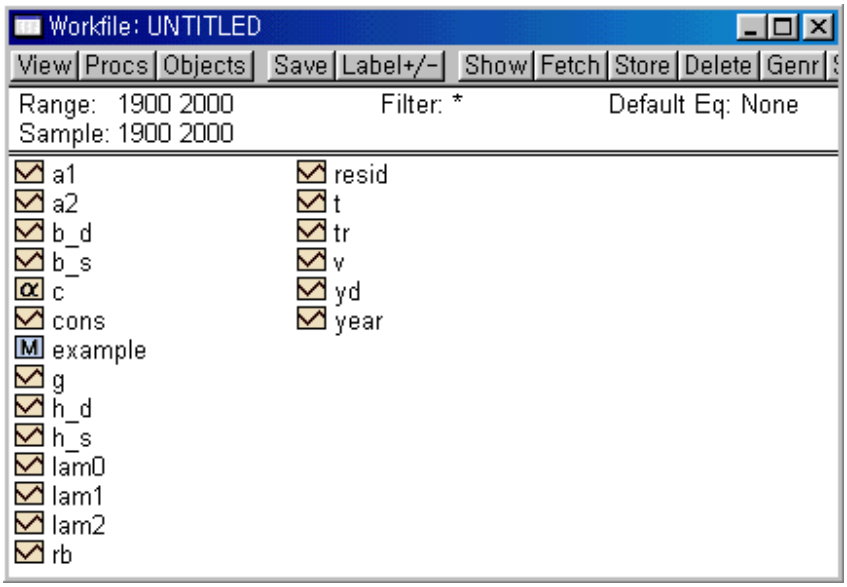
✓ Alternatively, you can input the value by choosing **GENR** in the ***Workfile***.



➢ All variables in your equations must be generated. To facilitate all simulations (cf. 4.3) you also create a variable ***year*** using the following syntax:

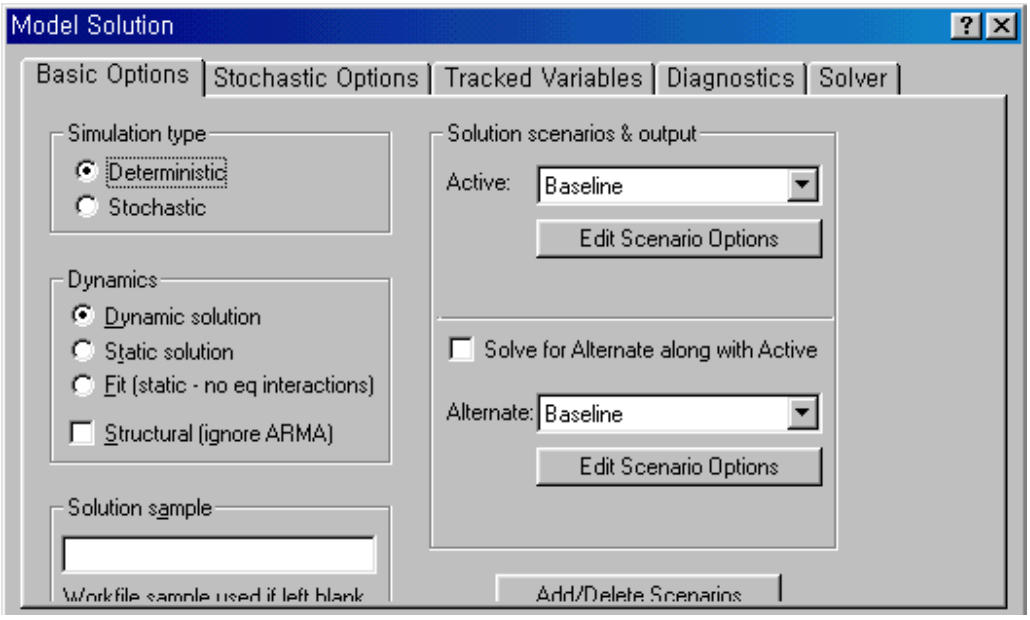
```
Genr year=@trend
```

➢ Now you can save your model. If you followed all the steps you should see on the screen the following:

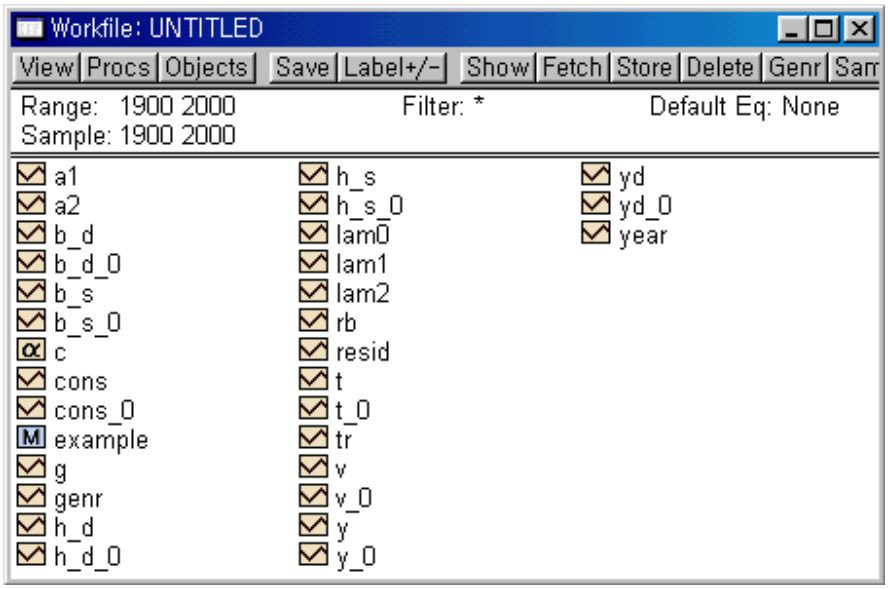


4.2 A simulation test

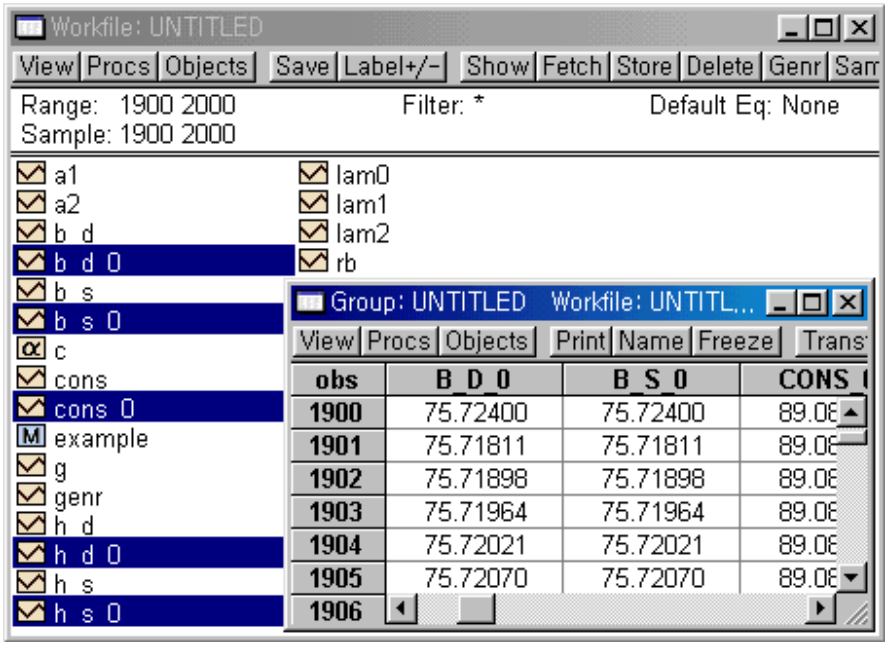
- After you saved your model, you can conduct a test to verify your steady state variables and the convergence of you model.
- In the ***Model Windows*** tool bar you have an option **SOLVE**. You only have to click.
  - ✓ A ***Model Solution*** dialog box appears.
- The ***Model Solution*** dialog box offers various options for controlling the solution process. You can choose *Dynamic solution*, *Static solution* or *Fit each equation*. One usually use the **DYNAMIC SOLUTION**, whole period specification.
  - **DYNAMIC SOLUTION** performs true multi-step forecasts. If you select this option, EViews uses steady state data for lagged endogenous variables if they are dated prior to the first period of the simulation. Thereafter, it uses the values *forecasted* by the model itself.



➢ Now, the results of this simulation (for endogenous variables) are created with the suffix **'_0'**.



- You can group the results of (endogenous) variables that you want to open. Hold the "**Ctrl**" key (on the keyboard) and choose, at the same time, the series that you want to open, clicking the left button of mouse. Click, in turn, **View / Open Selected / One Window / Open Group** in ***Workfile Window***. (Alternatively, point the mouse on one of the series (in blue) that you want to open and right click. Select **Open / As A Group**.) To save the group, in the ***Group Window Toolbar*** click **Objects / Name** and give the name of the group.

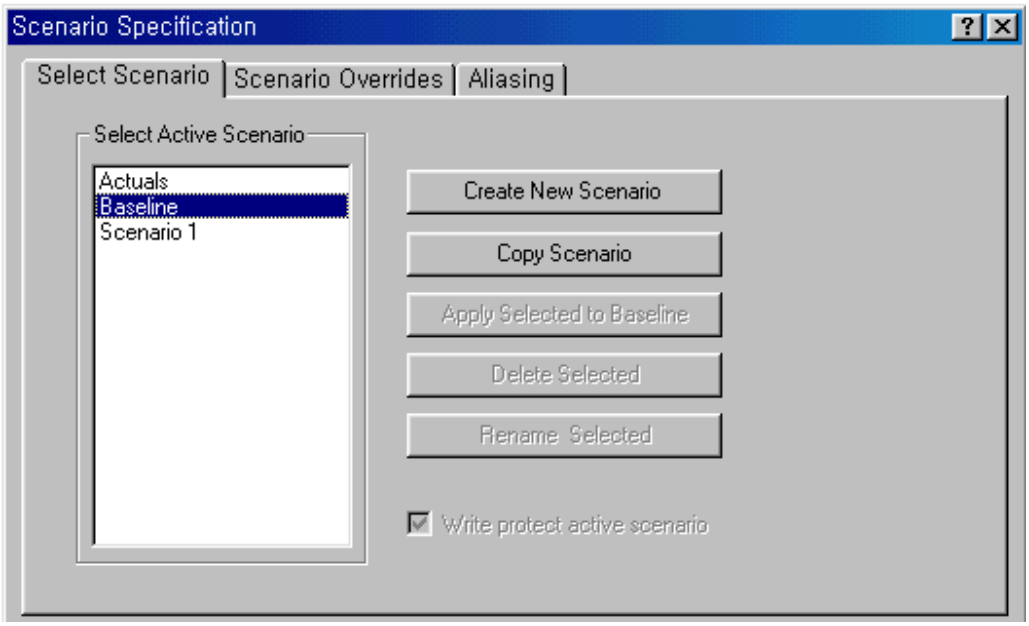


- If the model is properly specified and the steady state values correct, an endogenous variable **MUST** have the same value as the variable with no suffix. That is, the graphs of results must show **straight lines** even for endogenous variables over the time period, because you already inputted the steady state values of endogenous variables at ***stage 4.1***. (**If you don't know the initial steady state values of endogenous variables, you can obtain them through this procedure, given the arbitrary values of endogenous variables with long time periods, at least 100.**)
- To confirm whether the graphs are straight, click **View / Multiple Graphs / Line** in the ***Group Window***. (Here, **if a graph shows differences within the decimal fraction, for example within 0.00001, then you could ignore the differences**.)

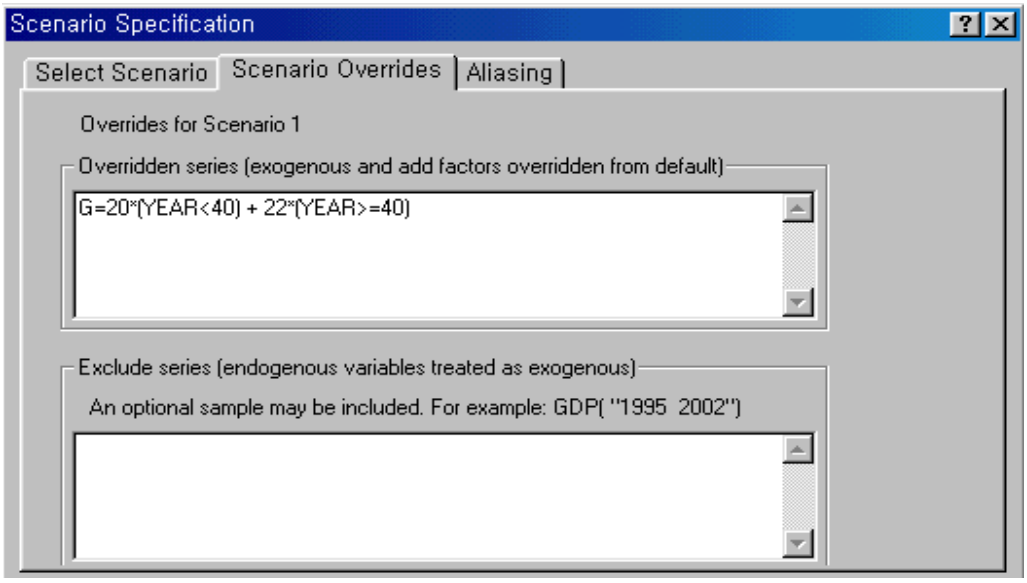
4.3 Conduct of an experiment

- Suppose you want to explore results after a 10% governmental expansion (G goes to 22) in 1940. To do so, you need to change your steady state value of the G using a logical command and the ***year*** variable (cf. 4.1).

- Note that you **MUST** choose the scenario menu to avoid destroying your **original steady state** used at ***stage 4.1***. Click **View / Scenarios…** in the ***Model Window***.
  - ✓ A ***Scenario Specification*** dialog box appears.



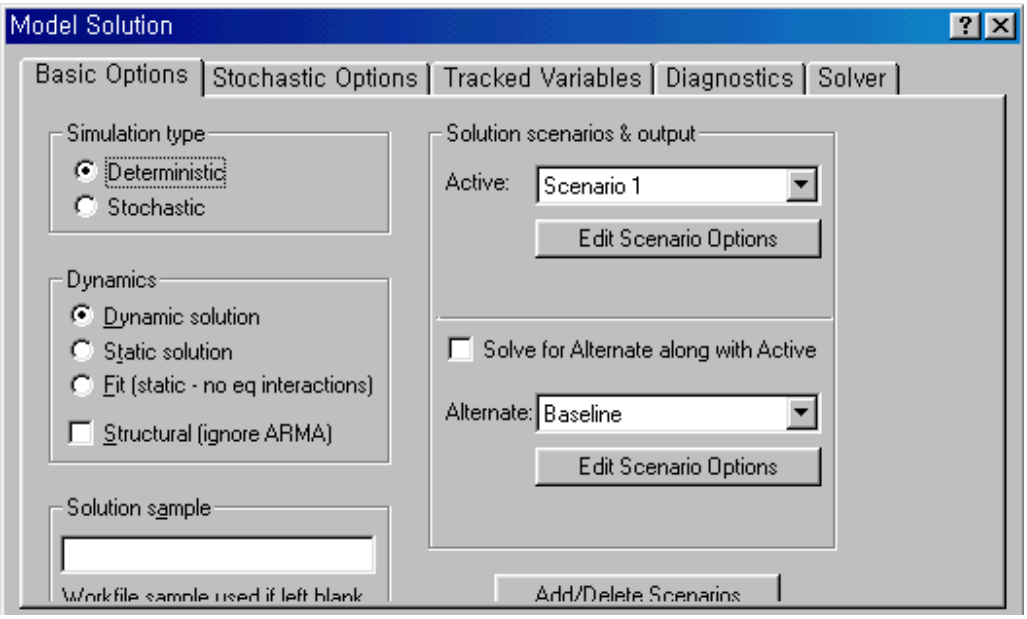
- Click **Create New Scenario** (here I only select Scenario 1), and in turn select **Scenario Overrides**. Input the following statement (knowing that 1900=0, 1901=1, 1902=2, …, 1940=40 etc.): `G=22*(year>=40)+20*(year<40)`

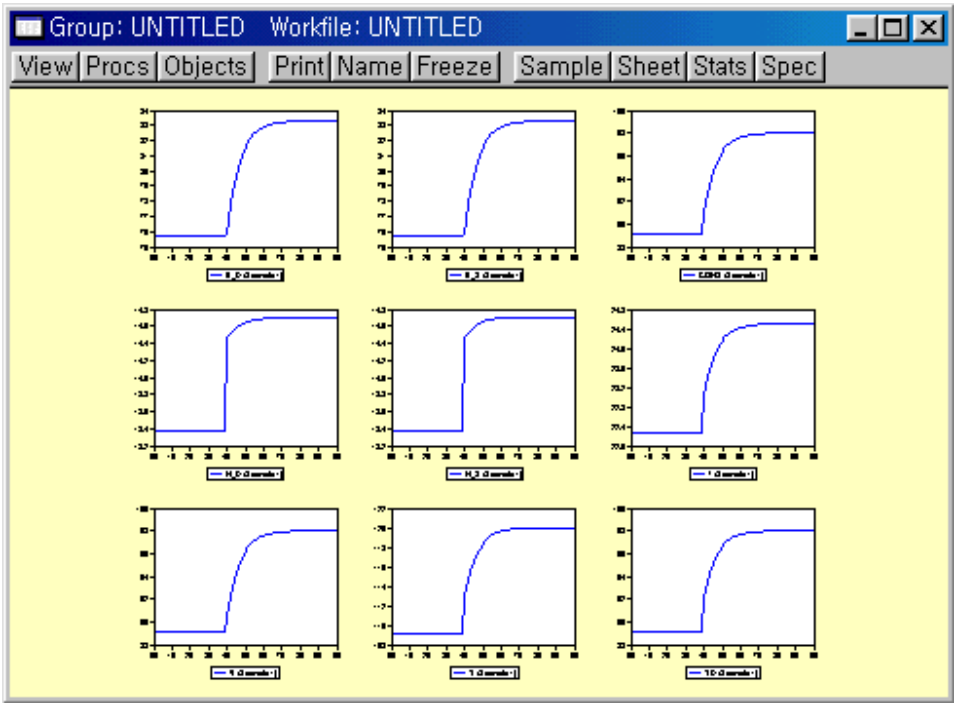


- In the upper box under the ***Main Toolbar***, enter the following statement as ***stage 4.1***:

```
Genr G=22*(year>=40)+20*(year<40)
```

- Now the new values of G are integrated, and you can solve the model again using procedures of section 4.2. Note that you **MUST** select the scenario which you want to solve in the **Solution scenarios & output** menu of the ***Model Solution*** dialog box. The new results of the simulation (for endogenous variables) are created with the suffix **'_1'**.





- You can repeat the simulation under various scenarios and compare with the baseline forecasts. Note that before running another simulation, you **MUST** go back to the **original value** of the exogenous variable which you changed in the previous state, that is, G = 20 over the whole period.