

## Applying the Model to New Data

Using the files on the website to apply the standard neoclassical growth model to different data can be a quick and painless process.

### Data

There are 10 data series required to calibrate and run the model. They are listed below along with their table and description in the SNA93.

One place to find most of this data for OECD countries is Source OECD, <http://www.sourceoecd.com>. Select national accounts data in the left column of the home page. Select Annual National Accounts and then choose Annual National Accounts Volume II – Detailed Tables – Main Aggregates. Be sure to choose the most recent edition.

Data:

1. Population 16-65
2. Real GDP – Table 2: K. Gross domestic product at market prices (output approach)
3. Real Investment
4. Total Hours Worked
5. Compensation of Employees – Table 3 Compensation of employees
6. Nominal GDP – Table 2: C. Gross domestic product at market prices (output approach)
7. Taxes less Subsidies – Table 2: C. Taxes less subsidies on products
8. Household Mixed Income – Table 13: HH. Operating surplus and mixed income
9. Household Depreciation – Table 13: HH. Consumption of Fixed Capital
10. Total Depreciation – Table 2: C. Consumption of fixed capital

In the base case model, real investment is nominal investment divided by the GDP

deflator, or  $I_{real} = I_{nom} \cdot \frac{GDP_{real}}{GDP_{nom}}$ , so 3 can be calculated from 2, 6, and 10.

Population 16-65 data can also be found at Source OECD. Click on the statistics tab at the top of the main page. Move the cursor over OECD Database and select employment from the menu that appears. Select Population and Labor Force Statistics database. Total Hours Worked can be found at the Groningen Growth and Development Center, <http://www.ggdc.net/dseries/totecon.html>.

The household data, 8 and 9, are not available for many countries over long periods. These statistics are used to calibrate the labor share  $(1-\alpha)$  by removing mixed income from GDP, since the labor share of mixed income is not included in compensation of employees. There may be other reliable ways for determining the labor share of mixed income. When none are available,  $\alpha = 0.3$  is a reasonable specification (Gollin 2002).

## **Change BaseCaseCalibration.xls**

The data above can be pasted directly into the excel spreadsheet. Put series 1-4 into columns B-E of the 'calibration' worksheet. Put series 5-10 into columns B-G of the 'calibrate alpha' worksheet.

If the time period of your data is the same as that of the Finish data, you are ready to calibrate  $\delta$  and  $K_{T_0}$ . If your data has a different date range several formulas will have to be adjusted.

In 'calibrate alpha,' the averages in F1 and F2 should be changed to fit the data. Select a large number of years extending to the present. This should be the time period you are modeling.

The average growth rates in 'calibration' should be changed so that the denominator is from the first available year, the numerator is from the last available year, and the exponent is  $1/(\text{last year} - \text{first year})$ .

The averages in I5 and I9 cells should also be adjusted to the available data. I5 should be over the same years as F1 and F2 from the 'calibrate alpha' worksheet. I9 should be the decade immediately following the first year of the data (for which we are calibrating  $K_{T_0}$ ). It is important that the range of years for these averages do not overlap.

In columns X-AC the series are assumed to grow at a constant rate after the last year of available data. Be sure that these formulas are still specified correctly if your data ends at a different year. There should be a large number of these extra years in the series (35 in the example with Finland).

Change the averages in M3:06 as appropriate. The averages for 1970-1980 are used to calibrate  $\beta$  and  $\gamma$ . These cells (02 and 03) should represent a time period which does not overlap with the model period.

When all of the changes to both spreadsheets have been made,  $\delta$  and  $K_{T_0}$  can be calibrated using excel solver. Select 'Solver...' in the tools menu. If solver is not in the menu it may not have been installed. Select 'Add-Ins...' in the Tools menu to install it. Set up the solver to set I6 = 0 by changing I1:I2 with the constraint I10=0. These should be the default options. Excel should rapidly find new values for  $\delta$  and  $K_{T_0}$ .

## **Save the Data**

The program for the base case model uses two text files as inputs, paramBase.txt and dataBase.txt. Paste the values of cells X3:X9 in 'calibration' in the 'paramBase' worksheet. While the 'paramBase' worksheet is active, save the file as 'paramBase.txt' with type 'Text (Tab Delimited)'. Click OK to save only the active worksheet.

Next select the range of data in rows X-AC and again paste the values into the 'dataBase' worksheet. Again, while 'dataBase' is active save the file as 'dataBase.txt' with type 'Text (Tab Delimited)'. Click OK to save only the active worksheet.

### **Run the Program**

Everything is set. Open MATLAB and run depressions.m from the editor window, or make sure the file is in the active directory and type 'depressions' in the command window without the quotes.

The program saves output to output.xls. Copy these results into columns AG-AM in the 'calibration' worksheet. The graphs on sheets L%N, Y%N, and K%Y now compare the new data to the new model.

### **References**

Gollin, Douglas 2002. Getting income shares right. *Journal of Political Economy*, 110(2), 458- 474.