

Econ 100B: Economic Analysis — Macroeconomics

Project Data Sources Guide

Fall 2020

Solow-Swan Model

Real GDP per Capita:

Look through the Maddison Project Database and use the given values for $cgdppc$, similar to the process you used in the problem set to obtain the necessary data for Germany.

Capital Share of Income:

Look through the Penn World Tables (PWT) and find the corresponding data for the share of labor compensation for your country. You should then be able to transform these values into the capital share, which you can then average across the relevant years to obtain your value for α .

Depreciation Rate:

Look through the PWT and find the corresponding data for the average depreciation rate of the capital stock. Averaging these values will give you δ .

Savings Rate:

There are a few approaches that you can use to calculate the savings rate for your country.

1. Look through the PWT and find the corresponding data for Gross Capital Stock. This is the total amount of capital that a country owns. Copy the relevant data onto a spreadsheet. Copy over the depreciation rate for these years onto the spreadsheet as well. In one column, calculate the change in capital stock over time. In another column, calculate the depreciation of capital stock over time, by multiplying the depreciation rate by the capital stock. Sum the values across these two columns and lastly, take the average of these values to obtain your savings rate. *(Note: Be sure that there is no significant change to the savings rate during the time period in question, as this might be indicative of a savings rate shock. In this case, you'll want to be careful about how you average the rates.)*
2. Look through the PWT and find the corresponding data for Real Domestic Absorption and Real Domestic Consumption. Calculating the difference between these values and then dividing by Real GDP should give you values for the savings rate. Lastly, take the average of these values to obtain your one value for the savings rate. *(Note: Similar to method 1, ensure that there is no significant change to the savings rate during the time period in question.)*

3. Look through the World Bank Database and find the corresponding data for Gross Capital Formation. Divide by the Real GDP and then take the average of your values to obtain your savings rate. (*Note: As with methods 1 & 2, ensure that there is no significant change to the savings rate during the time period in question.*)

Growth Rate of Labor:

Look through the OECD databases to find data on the labor force for your country. Use these values to calculate the percent change over time, which will give you the labor force growth rate. Average these values to get the growth rate of labor for your calculator.

Growth Rate of Efficiency:

Look through the OECD databases to locate data on Multifactor Productivity. This is equivalent to total factor productivity that we discussed in class. Use the relationship between labor efficiency and total factor productivity, to transform the data. Calculate the percent change over time and then take the average to obtain your value for the growth rate of efficiency.

Notes related to Solow-Swan:

- Depending on your country of choice, all the data may not be available. To the extent that the variable in question can be estimated using some other method, you may need to explore other means of finding the necessary values in these cases. One method is to use Excel's solver tool to find the values of the missing variables that minimize the sum of squared differences between your calculated Y/L and the actual Y/L . However, if you are missing data for multiple variables, it may be to your benefit to revise your selection in terms of the country and/or time period that you choose to work with.
- A lot of the data isn't available for years before 1950, which can be an issue if you're interested in looking at WWII shocks. In this case, it's likely that your time period might be something like 1940-1980. There are a couple of ways to tackle this issue, one of which would be to simply take the average of the parameters over the years that you do have data for them (1950-1960 and beyond). Another would be to use Excel's solver tool as mentioned above.
- Check to make sure that the values of your shocks and parameters make sense. For example, if you've settled on an initial value of 1000 for efficiency, or have a growth rate of efficiency of 20%, or a savings rate of

5%, etc. odds are you've made a misstep somewhere. This could be due to issues with your calculations, or in some cases with the way in which the data is presented / recorded. Depending on the issue, you'll need to revise accordingly.

- Check to make sure that your Y/L line converges back to Balanced Growth. If it doesn't, again odds are that you've made a misstep somewhere. Check your choice of shock(s) and parameters and proceed accordingly.

Monetary Policy Model

Gamma, Beta, Zeta:

Data for these elasticity terms are not readily available online. As such, one approach to calculating these is to vary the values “by eye”. A good starting point would be to use the values that we had in the problem set, and then change them if necessary, once you’ve settled on a sequence of shocks. If you are familiar with the Solver tool in Excel, another method for calculating these terms would be to find the values for these variables that minimize the sum of the squared differences between the calculated and observed values for inflation and output after deciding on your shock sequence. *(Note: In theory, you can calculate gamma by multiplying Okun’s Coefficient for your country by the slope of the Phillips Curve. If you decide to use this approach to calculate the value of gamma, make sure that you’re only looking at the Phillips Curve over the years that you plan to model with your calculator. As you may remember from the lectures, the nature of the Phillips curve has changed over time, becoming more elastic in recent years. Therefore, plotting the Phillips curve over the entire time frame that data is available will likely give you an inaccurate value for omega.)*

Output Gap:

Data for the output gap can be found in a couple of ways.

1. Locate and download data for the unemployment rate and natural rate of unemployment from the OECD websites, to calculate the unemployment gap. Locate Okun's Coefficient for your country and then calculate the observed output gap using Okun's Law.
2. Directly download the output gap data for your country if it's available on Quandl (*see the link contained in the "Data Locations" Excel spreadsheet on bCourses*).

Omega (If calculating gamma using Philips Curve):

Remember that the Philips Curve describes the relationship between Unemployment and Inflation. Therefore, you can calculate Omega (*the slope of the Philips Curve*) by plotting data for the unemployment rate and inflation rate using a scatter plot, and then using the slope of the regression line as your value for omega. (*Note: The regression line can be obtained via Excel, similar to what you did for the problem sets*)

Okun's Coefficient (If calculating the output gap using Okun's Law):

The Okun's Coefficient for a number of countries can be found in the Ball, et al. paper that is now posted to bCourses in the Final Project folder.

Notes related to Monetary Policy Model:

- Do a reality check on your shock sequences. For instance, it's great if a shock to both output and inflation, for six out of the eight years that you're looking at, results in your calculated values matching your observed values precisely. Unfortunately, this and other examples like this are not very realistic. In other words, remember that the practice of matching models to data isn't always perfect, and that it's OK to have differences in your calculated and observed values, as long as they're not major and persistent throughout the entire timeframe that you're looking at.
- The Monetary Policy Model is a short run model, with half lives that are usually quite small in relation to the Solow-Swan Model. Thus, the timeframe that you decide to study should reflect that.
- Check to make sure that your values for the parameters make sense. Specifically, when estimating these by eye, using Solver, or some other technique, make sure that you don't get so caught up in matching your calculated values to the observed values, that you end up with nonsensical values for these terms.

General Notes on Data Collection

- Note that this guide is meant to assist you with gathering all the necessary data for your project and to try and address potential issues that may arise. It's perfectly OK for you to use different sources or methods in obtaining your data than what is listed here. For instance, data for some countries exists on FRED, but FRED wasn't mentioned as a source anywhere in this document.
- The OECD has two different websites, with different databases (*stats.oecd* & *data.oecd*). Make sure that you check both websites when attempting to find data. (*Note: When going through the Economic Outlook Tables on the stats.oecd website, you can play around with the time range and which variables are displayed, by clicking "customize" on the top left of the page*)
- If a lot of data that you need is not available for your country or the time period that you want to look at, you might need to think about making some changes to your choice, even though it might be interesting and work well with the models in theory.