

Tips for ECON 442 Problem Set

Tips for Problem 1

- Shortcut commands for Microsoft Word Equation Editor: [Link 1](#) [Link 2](#)
- Save often, since Word doesn't have the best stability. Other word processors, such as [LaTeX](#) (I use [Texworks](#) for my papers) are more stable and flexible if you'd rather use something else, however they have much higher learning curves
- We won't cover it in this class, but Mathematica can do symbolic computing. I highly recommend learning a symbolic computing language to help check your work and do simple calculus for you. [WolframAlpha](#) can provide this on a very limited basis.
- A balanced current account (Current Account = Exports – Imports + Net Transfers) is separate from the market clearing conditions, and not needed when you define the equilibrium. It will hold in equilibrium, it just does so automatically (even without Walras' law) since.

1.vii)

- The terms of trade is the price of exports relative to the price of imports. For the Foreign country that's p_2/p_1 .
- If relative prices don't change with T, you did something wrong.
- The point of this question is to contrast with the [worksheet](#) we solved in class; to see how the presence of a nontraded sector effects how prices and labor allocations respond to transfers.

Tips for Problem 2:

- Google "Coding Best Practices" to find tips on how to write readable code that is conducive to debugging and editing.
- There are manuals to help you learn R available on the CRAN website <https://cran.r-project.org/manuals.html> and elsewhere on the internet. The "help" function in R is also useful if you don't understand what a function does. For example, typing `help(max)` will tell you what the `max()` function does.
- Numerical solvers are sensitive to initial points. As long as the parameters don't change too drastically, the symmetric equilibrium is often a good starting point for the algorithm.

2.iii)

- For reporting the new equilibrium, you can just copy and paste the Consumption_Allocations, Prices, etc results from RStudio to your document. You don't have to format them nicely.
- **Important:** Be sure to change L^H and L^F in the R code in two places. The first place is inside the function for solving the equilibrium. The second place is right after the function in the INITIALIZE EQUILIBRIUM GUESS section. They are both set to 1 initially, and need to be set to 10. This is to generate a reasonable initial guess for when you call the `multiroot()` function.

2.vi)

- Be sure to update L^H to 100 in both places
- You have to run the code once with $\tau = 1$ and once with $\tau = 1.1$

- Consumption allocations is a matrix with the values of consumption arranged as (\equiv means defined as):

$$\text{Consumption_Allocations} \equiv \begin{bmatrix} c_{1H}^H & c_{1F}^H \\ c_{2H}^H & c_{2F}^H \\ c_{1H}^F & c_{1F}^F \\ c_{2H}^F & c_{2F}^F \end{bmatrix}$$

Therefore to access c_{1H}^F you write in R: `Consumption_Allocations[3,1]` which indicates you want the value that is in the 3rd row of the 1st column.

To get c_{1F}^H you would write: `Consumption_Allocations[1,2]` which is the 1st row in the 2nd column

To get c_{2F}^F you would write: `Consumption_Allocations[4,2]` which is the 4th row in the 2nd column

Therefore instead of writing:

$$(c_{1H}^H / L_H)^\rho$$

You can write:

$$(\text{Consumption_Allocations}[1,1] / L_H)^\rho$$

Although you also need to have values saved outside of the function for L_H and ρ . If you don't you can just put them in by hand, e.g.

$$(\text{Consumption_Allocations}[1,1] / 10)^{0.5}$$

2.vi)

- You can copy and paste the `Labor_Allocations` vector to answer this. The point of this question is to contrast it with our earlier models where there was no taste for variety and only comparative advantage. In those earlier models, productivity did not affect labor allocations for a good. From this we can learn something about the mechanism through which productivity should affect the allocation of factor inputs.

Tips for Problem 3

- Register an account on WITS (<http://wits.worldbank.org/register.html>).
- To download the data on WITS go to "Advanced Query" → "Trade Data (UN Comtrade)". The reason we use WITS instead of Comtrade is because WITS reports aggregated data for "All Countries."
- **Important:** Not all goods are traded in both 1990 and 2010, and not all goods exported by "All Countries" will be exported by the World. In excel, we can use the [Vlookup function](#) and/or [Pivot Tables](#) to align the data.

3.ii)

- When looking at growth for goods with a RCA Index > 1 you can use the [SUMIF function](#) or you can [sort the data](#) by RCA Index value and do everything by hand. [Array Functions](#) may also be helpful.
- We delete zeros since in the next question we will compute percent changes. You won't need the zeros again, so it is okay if you simply delete them.

3.iii)

- **Important:** The trade values from WITS are typically in 1000s USD. The GDP values are probably in different units, like simply USD. It is important to change them. In general, Exports/GDP ranges between 5% to 60% for most countries, so you can always check that you get a reasonable value for that.
- You'll know you have the right series if Pakistan's GDP in 1995 is 60,636,022,422 USD. Note it may differ slightly, since there are occasional updates and data revisions; but it should be very close to that number.
- You can compute the correlation between two vectors by using the [CORREL function](#)

3.iv)

- You can compute the median with the [MEDIAN function](#)
- To compute the total growth for all exports with RCA Index less than 1 you should sum up the total value of trade in the base period and the total value of trade in the final period, then use the %Change formula with those two values substituted in for X. Sorting or the SUMIF function could be useful.
- Simply taking the mean across the % changes you computed in 3.iii will give an incorrect answer, since you would need to use a [weighted average](#) to get the correct answer (weight by initial trade value of each good). The above bullet is easier to implement than this, although both methods give the same answer.

3.v)

- For what you thought would happen there's no right/wrong answer
- There are correct and incorrect answers for why the Balassa RCA Index might not be a good measure of true comparative advantage