Note on convergence problems with large CGE microsimulation models

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Convergence can be a real problem with large CGE micro-simulation models. There are at least two factors that we think are at the source of this resolution problem. One is the size of the model and the second is the degree of non linearity of the model. For example, if the demand system is derived from a Cobb-Douglas utility function, it is better to write $pq_i * c_{i,h} = beta_{i,h} * Yh_h$ then $c_{i,h} = beta_{i,h} * Yh_h / pq_i$. One should also be careful with CES and CET functions when start values are very different from each other. For example, for Ex and D if you have a very small Ex relative to the D in the CET export function you will have resolution problems. Here are a few suggestions:

1- (from Caesar Cororaton): Solve the model with only one household category (the sum of all households in the microsimulation model) to ensure that the model itself is functioning well. Ensure that there are no infeasibilities in the first iteration:

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*---------------------------------------------------------------------------------------------------------------------
   Iter Phase Ninf   Infeasibility   RGmax    NSB   Step InItr MX OK
      0   0        2.5266899684E-11 (Input point)
      1   0        2.5266899684E-11 (After pre-processing)
*---------------------------------------------------------------------------------------------------------------------
```

2- Try scaling the model (dividing all values by 1,000 (or more)). The GAMS users manual (available at www.gams.com) discusses this issue.
3- When you have small values in the CET and CES functions, put them equal to zero. They won't change much in your results anyway.
4- Linearize your functions as best you can.
5- Use the best computer you have (for example, it may take 6hrs with a Pentium III and only 20 minutes on a Pentium IV)!!!
6- Don't use MINOS!!! (for example, a model may solve with MINOS in 25 minutes versus four minutes with CONOPTII).
7- Increase the iteration and resolution time limits in GAMS by adding the following lines option reslim=20000; option iterlim=100000;
8- Check the GAMS users manual for other default items that might also cause problems.
9- Use CD instead of LES for consumption.
10- If you use LES check all minimal consumptions to make sure there are no negative minimal consumptions. This can create resolution problems.
11- Try with all factors mobile to see if factor immobility is a source of problem.
12- Reduce the number of goods you have if the above changes fail to resolve your problem.

We hope these suggestions allow you to resolve your problems.