

## Chapter 4

### 4. TABLO-Generated Programs and GEMSIM - Timing Comparison

In this chapter we show the CPU times for solving some typical simulations with some of the example models. We report the CPU times for the same simulations carried out using a TABLO-generated program and also GEMSIM. We provide this information to assist source-code licensees of GEMPACK make a choice between these two ways of carrying out simulations.

The times reported are on a 133MHz pentium PC running Windows 95, with a source-code version of GEMPACK Release 6.0 using LF90. You should not take much notice of the actual times (which will vary between machines depending on their clock speeds, and will also vary between simulations depending on the number of steps required), but rather on the ratio between the GEMSIM and TABLO-generated CPUs. All simulations are Gragg 2,4,6-step except the 10x10 GTAP one which is Gragg 4,6,8. A fairly standard condensation of the model has been used in each case.<sup>27</sup>

**Comparison of Times for TG-programs and GEMSIM**

| Model  | Data size       | TG-program | GEMSIM   | Approx Ratio |
|--------|-----------------|------------|----------|--------------|
| GTAP   | 10x10           | 165 sec    | 300 sec  | 1.8          |
| GTAP   | 15-com,10-reg   | 330 sec    | 460 sec  | 1.4          |
| MONASH | 26-com,25-ind   | 130 sec    | 820 sec  | 6.3          |
| ORANIG | 122-com,119-ind | 510 sec    | 3970 sec | 7.8          |
| ORANIG | 37-com,35-ind   | 50 sec     | 240 sec  | 4.8          |
| ORANIG | 23-com,22-ind   | 35 sec     | 100 sec  | 2.9          |

Note that GEMSIM and TABLO-generated programs take the same time as each other for the actual simulation part (LU decomposition, MA28/MA48 calls) and for reads, writes, displays, sets and subsets. The differences come from formulas, submatrices (equations), backsolves and updates.

It is likely that the more condensation is carried out, the greater will be the ratio between GEMSIM and TABLO-generated program times.<sup>28</sup> In particular, when large numbers of substitutions and/or backsolves are done during condensation, there will be larger numbers of extra coefficients (the ones with names like C00456), with their associated formulas, created during the condensation stage of TABLO. The formulas for these are often quite complicated and these add to the CPU ratio.

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<sup>27</sup> The times and ratios reported may be quite different if the condensation is changed.

<sup>28</sup> For example, there are more condensation actions with ORANIG and MONASH than with GTAP.