# Comparison of the results with GTAP9.1

For the comparison of the EU-GTAP estimated input coefficients with their GTAP9.1 counterparts we considered the 159 most relevant coefficients for the 28 countries, i.e. 4452 coefficients. Besides, we have used GTAP9.1 French input coefficients as the standard reference to evaluate the new estimated input coefficients. This is mainly because of the big size of the French economy and the facts that all its sectors have positive gross output (and so all other countries can be compared with it and its input coefficients) and that their statistical system is experienced enough in producing economic statistics.

Subsequently, another filter was applied due to the large number of relevant coefficients identified. We were more lenient with own consumption coefficients, energy input coefficients and agricultural inputs into the food industry provided that we mostly used official statistics and other auxiliary data (IEA, GHG reports, CAPRI, etc.) to produce such estimations. Moreover, own consumption coefficients can be distorted by firm organisational characteristics of the sectors (e.g. division of labour across establishments of the same firm), such as the case of motor vehicles.

After dropping all those (total) input coefficients, there remained 636 input coefficients for which the EU-GTAP model estimates might be considered arguable while for the GTAP9.1 database, these were 704. As a result, our conversion method reduced the number of arguable coefficients by 10% with respect to GTAP9.1, which cannot be regarded as a negligible achievement. For some countries (see Figure 1) the reduction was much greater, in particular for the big economies. For Germany, the reduction was 56%[[1]](#footnote-1) and for Italy and the United Kingdom, the corresponding reductions were 39%[[2]](#footnote-2) and 60%[[3]](#footnote-3), respectively. Croatia's reduction was around 41%[[4]](#footnote-4). However, for some specific countries, the EU-GTAP estimates were not so successful. There were increases in the number of arguable coefficients in Austria (e.g. mining and electricity and gas distribution), the Czech Republic (e.g. cattle, electricity and raw milk) and Slovakia (e.g. gas distribution). The remaining arguable EU GTAP coefficients are rather dispersed across sectors. Figure 1 also represents the geographical distribution of the arguable input coefficients by countries, both for the EU-GTAP and GTAP9.1 databases. Lithuania ranked first with 7.4% of the coefficients in the EU-GTAP database and second in the GTAP9.1 database (6.8%) after Croatia (8%).

Table 1: Comparison of implausible implicit input coefficients of the GTAP9.1 data and the model estimates

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Implausible coefficients in GTAP9.1** | **Model results implausible coefficients** | **Percentage change of the implausible coefficients** |
| **AT** | 11 | 23 | 109% |
| **BE** | 18 | 15 | -17% |
| **BG** | 26 | 27 | 4% |
| **CY** | 31 | 23 | -26% |
| **CZ** | 11 | 34 | 209% |
| **DE** | 34 | 15 | -56% |
| **DK** | 18 | 16 | -11% |
| **EE** | 24 | 25 | 4% |
| **EL** | 32 | 29 | -9% |
| **ES** | 29 | 25 | -14% |
| **FI** | 16 | 20 | 25% |
| **FR** | 4 | 10 | 150% |
| **HR** | 56 | 33 | -41% |
| **HU** | 15 | 12 | -20% |
| **IE** | 28 | 26 | -7% |
| **IT** | 23 | 14 | -39% |
| **LT** | 48 | 47 | -2% |
| **LU** | 40 | 33 | -18% |
| **LV** | 30 | 22 | -27% |
| **MT** | 45 | 37 | -18% |
| **NL** | 21 | 19 | -10% |
| **PL** | 15 | 14 | -7% |
| **PT** | 10 | 14 | 40% |
| **RO** | 31 | 35 | 13% |
| **SE** | 13 | 12 | -8% |
| **SI** | 21 | 16 | -24% |
| **SK** | 14 | 23 | 64% |
| **UK** | 42 | 17 | -60% |
| **Total** | **706** | **636** | **-10%** |

Source: Own Elaboration.

**Figure 1.** Geographical distribution of arguable input coefficients

Source: Own Elaboration.

Table 2: Comparison of some estimated input coefficients (%) with GTAP9.1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GTAP code**  **(input)** | **GTAP code**  **(user)** | **Country** | **EU-GTAP coefficient** | **GTAP9.1 coefficient** |
| crp | wht | Belgium | 7.7 | 40.2 |
| ocr | c\_b | Belgium | 2.8 | 0.1 |
| otp | omn | Czech Republic | 23.4 | 6.7 |
| ctl | cmt | Lithuania | 53.2 | 2.8 |
| ely | cns | Spain | 1.3 | 0.2 |
| ely | coa | Belgium | 8.9 | 0.7 |
| ely | coa | Italy | 7.1 | 62.5 |
| ocr | ctl | Czech Republic | 1.6 | 7.8 |
| ofd | ctl | Germany | 13.3 | 4.8 |
| ofd | ctl | Slovakia | 2.1 | 23.7 |
| ely | ely | Portugal | 45.7 | 2.8 |
| ely | gdt | Austria | 30.9 | 4.0 |
| crp | gro | Ireland | 33.7 | 18.0 |
| p\_c | gro | Finland | 7.0 | 21.6 |
| ely | i\_s | Malta | 1.3 | 52.2 |
| omn | i\_s | Bulgaria | 8.2 | 26.1 |
| lea | lea | Denmark | 44.1 | 20.0 |
| mil | mil | Luxembourg | 3.4 | 44.6 |
| rmk | mil | Romania | 24.3 | 3.2 |
| ome | mvh | Hungary | 30.5 | 17.0 |
| ely | nfm | Greece | 10.9 | 16.9 |
| nfm | nfm | United Kingdom | 39.5 | 53.0 |
| ofd | oap | Belgium | 29.3 | 45.0 |
| crp | ocr | Ireland | 33.7 | 26.0 |
| p\_c | ocr | Croatia | 1.8 | 15.7 |
| ocr | ofd | Latvia | 0.6 | 0.2 |
| ome | omn | United Kingdom | 4.5 | 0.9 |
| oap | omt | Germany | 38.8 | 65.0 |
| p\_c | osd | Poland | 4.8 | 19.4 |
| total | osd | Slovenia | 57.0 | 18.4 |
| i\_s | otn | Bulgaria | 3.4 | 29.2 |
| oil | p\_c | Austria | 74.9 | 37.0 |
| oil | p\_c | Denmark | 80.7 | 57.0 |
| oil | p\_c | Netherlands | 75.5 | 53.0 |
| pdr | pcr | United Kingdom | 27.8 | 82.0 |
| gro | rmk | Luxembourg | 1.3 | 0.2 |
| ocr | rmk | Spain | 0.4 | 11.4 |
| c\_b | sgr | Hungary | 15.1 | 2.9 |
| c\_b | sgr | Italy | 14.2 | 3.3 |
| total | sgr | Bulgaria | 107.6 | 18.0 |
| total | sgr | Portugal | 91.0 | 28.0 |
| crp | tex | Austria | 26.0 | 10.7 |
| **GTAP code**  **(input)** | **GTAP code**  **(user)** | **Country** | **EU-GTAP coefficient** | **GTAP9.1 coefficient** |
| crp | v\_f | Hungary | 2.5 | 30.2 |
| ely | v\_f | Estonia | 14.0 | 13.9 |
| osd | vol | Slovenia | 37.2 | 4.2 |
| total | vol | Ireland | 63.2 | 23.0 |
| total | vol | Slovenia | 67.5 | 19.0 |
| crp | wap | Spain | 0.8 | 0.7 |
| crp | wap | United Kingdom | 0.8 | 0.5 |
| total | wap | Sweden | 70.8 | 26.0 |
| p\_c | wht | Germany | 2.5 | 0.1 |
| total | wht | Austria | 49.4 | 14.0 |
| crp | wol | Croatia | 3.0 | 1.1 |
| ely | wtr | Cyprus | 32.4 | 11.0 |

NOTE: The description of the GTAP codes can be found in one of the other supplementary files.

Source: Own Elaboration.

Table 1 illustrates (non-exhaustively) the two or three most problematic input coefficients of each country. These reflect some examples of input coefficients where the EU-GTAP estimates are much more reasonable than the former GTAP9.1 figures. For instance, in the GTAP9.1 database, more than 40% of the gross output of wheat production (wht) in Belgium was spent on chemical products (crp) whereas the EU-GTAP conversion method yields a lower consumption of 7.7%. A second example is the consumption of sugar beet seeds (ocr) by the Belgian industry of cane and sugar beet (c\_b). The GTAP9.1 database reports negligible values while our method estimates input expenditures around 3% of the total gross output value, which is rather more plausible since the production of cane and sugar beet in Belgium is almost concentrated on sugar beet. In another example, for the Czech Republic, the GTAP9.1 data imply that the cost of the other transportation services (otp) make up only 6.7% of the other mining (omn) output value, while we estimated this coefficient to be 23.4%. When consulting the detailed data from the Czech IOT, the corresponding coefficient turned out to be 22.6%, almost the same as our estimate.

We can therefore conclude that for most of the EU countries the EU-GTAP conversion method performed well. Certainly, this is primarily due to our great efforts (shown in Steps 1 to 6) to produce the best reference matrix (initial estimate) possible. As McNeil and Hendrickson (1985) and Round (2003) pointed out, if the initial estimates are close to the true values then distance minimizing models estimates would also be close to the same true values.

# References

McNeil, S. and Hendrickson, C. (1985) ”A note on alternative matrix entry estimation techniques”, Transportation Research:B Vol. 19B, No. 6, pp. 509-519.

Round, J. I. (2003), “Constructing SAMs for development policy analysis. Lessons learned and challenges ahead”, *Economic Systems Research*, 15(2), 161-183.

1. 15 arguable coefficients remained out of 34 in the GTAP9.1 database. [↑](#footnote-ref-1)
2. 14 arguable coefficients remained out of 23 in the GTAP9.1 database. [↑](#footnote-ref-2)
3. 17 arguable coefficients remained out of 42 in the GTAP9.1 database. [↑](#footnote-ref-3)
4. 33 arguable coefficients remained out of 56 in the GTAP9.1 database. [↑](#footnote-ref-4)