Response to a Problem Report on Sales Dispositions of Sugar Crops and Raw Milk in GTAP 7pre-x Data Bases

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This note addresses a problem report from Martin Banse, concerning the sales dispositions of sugar crops and raw milk in preliminary test versions of the GTAP 7 data base.

The report identifies unexpectedly high sales of sugar crops (GTAP sector `c_b`) to industries other than sugar manufacturing (`sgr`) and of raw milk (`rmk`) to industries other than dairying (`mil`). The report pertains directly to release 7pre2, but, as it notes, the situation in release 7pre3, the latest release to date, is similar.

The report includes a workbook showing industry shares in intermediate usage, of each of sugar crops and raw milk, for each region in the GTAP data base. I have replicated the workbook shares, as industry shares in the sum of the two arrays for intermediate usage of domestic product and imports at agents' prices, `VDFA` and `VIFA`, from release 7pre2.

The workbook marks as aberrant all cases in which the `sgr` share in purchases of `c_b`, or the `mil` share in purchases of `rmk`, falls below 80 per cent. It finds 57 such cases for `c_b`, and 76 for `rmk`. Of these, 43 cases for `c_b` and 64 for `rmk` involve "high" total intermediate usage of the raw material (it is not clear how the report defines "high", but it evidently involves some measure of the scale of the economy). It also marks as aberrant sales to users other than the expected major purchaser in excess of ten per cent of total intermediate usage; there are 81 such cases for `c_b`, and 110 for `rmk`.

To this point, all results pertain to GTAP release 7pre2, henceforward, to release 7pre3.

In release 7pre3, I find, the cross-region average share of `sgr` in purchases of `c_b` is 63 per cent, and for `mil` in `rmk`, 67 per cent. Other major purchasers, with percentage shares, are, for `c_b`,

`ofd`	8.2
`c_b`	5.6
`crp`	5.5
`mil`	2.6

and, for `rmk`,

`ofd`	4.6
`rmk`	4.5

Table 1: Unexpectedly high intermediate or investment usage of raw agricultural products by users other than the expected major purchaser, in primary regions, in GTAP release 7pre3 (USD M)

Comm.	Use	Region	Treat.	Actual	Expected
rmk	ofd	mex	N	4763	346
c_b	crp	bra	N	1931	252
rmk	cgds	mex	N	1599	176
rmk	crp	bgr	N	1473	145
rmk	ocr	bgr	N	1208	118
rmk	lea	chn	A	555	13
c_b	cns	chn	A	526	14
c_b	ofd	mex	N	1627	377
c_b	mil	mex	N	943	119
rmk	trd	chn	A	735	69
rmk	otp	bgr	N	735	73
rmk	ctl	fra	N	1144	265
rmk	trd	ind	A	747	113
rmk	v_f	ukr	N	316	9
c_b	ros	ita	N	266	6
rmk	wht	bgr	N	526	62

Treatment:
N : no disaggregation
A : disaggregation, including agricultural disaggregation

ctl	2.8
trd	2.8
cgds	2.4

Some of these may be defensible. In particular, without local expert advice, I would hesitate to reject sales of c_b to c_b, ofd, or crp, or sales of rmk to rmk, ofd, or, perhaps, ctl.

To select cases for closer study, I identify the largest deviations (weighted by money value) from the regional average sales dispositions, and from those select cases of above-average sales in primary regions to users other than the expected major purchaser (mil or sgr) or the primary industry itself. Results are reported in table 1. "Expected" usage is calculated using the cross-regional average sales disposition for each commodity.

Previously, in response to reports (of which there have been several) of such problems in earlier releases, we have blamed the unexpected flows on the contributed tables. In relation to this report, as observed by Terrie Walmsley, many of the flows complained of are in regions for which the Center has undertaken some sectoral disaggregation. Accordingly, we mark the disaggregation treatment in the table.

Concerning the cases reported:

- For Mexico, the contributed table is fully disaggregated, and shows substantial intermediate usage of raw milk, and substantial intermediate usage by the dairy industry, yet purchases of raw milk by the dairy industry are exactly zero. This seems clearly wrong. As the contributor is still active, she may be willing to address this.

- For Brazil, I note that the chemical manufacturing industry includes ethanol manufacture, and see no reason to question its purchases of sugar cane.

- For Bulgaria, the contributed table is fully disaggregated, and shows substantial intermediate usage of raw milk, and substantial intermediate usage by the dairy industry, though intermediate usage by the dairy industry appears small relative to usage of raw milk. Usage of raw milk by the dairy industry is positive but small, 2.5 per cent of total intermediate usage by the dairy industry. Again, this seems clearly wrong. As the contributor is also the author of the problem report, he may be willing to address this.

- For China, the contributed table provides just two agricultural sectors, crops and livestock, and just two food processing sectors, meat and dairy products and other food products. We therefore disaggregate it in house, using the agricultural and food products (AFP) data set described in chapter 12 of the GTAP 6 documentation. In the disaggregated tables, the raw products are the major intermediate inputs into the processed products, but the processing industries are relatively small, and most sales of the raw products are directed to other uses.

  - Typically, the leather industry purchases more of the processed products `cmt` and `omt` than of livestock or raw products. The Chinese contributed table, however, shows substantial sales of the latter to the leather industry (6.6 per cent of total intermediate usage of livestock). The disaggregation procedure assigns most of these to cattle and "other animal products", but some 12 per cent to raw milk. This assignment is ruled not by the AFP data set, which shows no production of leather, but by a supplementary data set, constructed by rough methods, and intended and suited only for minor data adjustments. A more sophisticated procedure might assign a higher share to "other animal products", which would seem somewhat more plausible.
  - The contributed table, quite unusually, shows substantial sales of crops to the construction industry (18 per cent of total intermediate usage). The disaggregation procedure assigns a small share (2.2 per cent) of these to cane and beet. Likewise, it shows substantial sales of livestock to trade services (14 per cent of total intermediate usage), and the disaggregation procedure assigns 12 per cent of these to raw milk. Whether or not the disaggregation procedure handles these cases optimally, the main source of their problems would seem to be the contributed table.

- The high share of the cattle industry in raw milk purchases in France, and of the "recreational and other services" industry in sugar beet purchases in Italy, reflect the sales dispositions in the contributed tables. Whether or not those features

are accurate, the I-O structures in those tables are less bad than in Mexico or Bulgaria, since they do at least show raw milk as a major input into dairying, and sugar beet as a major input into sugar manufacturing.

- The case in India is similar to those in France and Italy. Though the contributed table does not fully disaggregate agriculture, it does separately identify raw milk, and assigns a large share of its intermediate usage to the trade services industry, similar to that observed in the final data base.

These cases suggest:

- The main source of the problem is the contributed tables. This applies not only to those contributed fully disaggregated, but also to those subject to disaggregation in house.
- In some tables disaggregated in-house, improvements in procedure may be somewhat helpful.
- Unexpected flows are not necessarily wrong.

What is to be done?

1. As always, going forward, our best solution is close scrutiny of I-O data at contribution time. In particular, with new European Union member tables expected for use in release 7, we may hope to rectify or justify the unexpected flows observed in the previous contributions for France and Italy.
2. In selected cases, it may be worth pursuing the issue retrospectively with the contributor. Mexico and Bulgaria appear to be leading candidates for this treatment. If and when resources are available to pursue this further, table 1 can readily be extended to provide further candidates.
3. Changes to the disaggregation procedure, already under discussion in house, may reduce problems such as that observed in the Chinese leather industry. Given other needs, however, our first opportunity to undertake them will likely follow the release of version 7.
4. Given the large number of cases involved, we cannot hope to address them all in a timely manner through dealings with individual contributors. That brings us to the issue of retrospectively revising tables in house. That would doubtless be welcome to stakeholders. We have received complaints on this subject previously; at least one stakeholder, the present problem reporter, has found it necessary to revise the data; others likely have encountered or will encounter the same necessity; it would serve the general good and the Project's purpose to do it centrally, once for all. On the other hand, we would need to take care to preserve unusual but valid flows, and to establish priorities amongst this and other areas of questionable I-O structure, such as ownership of dwellings. Given other needs, our first opportunity to undertake this is likely to follow well after the release of version 7.