

On Rice in the GTAP Data Base

Robert McDougall

2007–11–08

This note describes investigations by myself and Badri Narayanan undertaken in response to a problem report on GTAP-L, that in release 6 of the GTAP data base, duties are not levied on imports of paddy rice (**pdr**) from Korea into Japan.

The report was made by Kameyama Hiroshi of Kagawa University on 2007-11-04. The concern was substantively addressed by the observation that the particular trade flow of concern to the correspondent is negligible in value. Nevertheless, its investigation raised concerns about other aspects of the data base.

At the outset, I believed that paddy rice is, because of its physical characteristics, little traded, and that trade in paddy rice globally is therefore small. I was therefore concerned to find that paddy rice trade in GTAP 6 is considerable, US\$2.2 billion CIF, or 25 per cent by value of total rice trade.

As it turns out, our current trade classification concordance maps to the GTAP commodity paddy rice not only HS code 100610, “rice in the husk (paddy or rough)” but also code 100620, “husked (brown) rice”. This is consistent with our definition of **pdr**, which includes not only CPC code 0113, “rice, not husked” but also code 0114, “husked rice”. But our definition is inconsistent with the International Standard Industry Classification (ISIC), which counts brown rice production as a manufacturing activity, and husked rice as a manufactured good. Since we aim in the GTAP sectoral classification to draw the boundary between agriculture and manufacturing consistently with the ISIC, our definition is in error.

A second concern was that, although Korea’s exports of paddy rice to Japan are negligible, several other countries show non-negligible exports with zero tariffs. Altogether, just eight out of eighty-seven countries show non-zero tariffs in the tax rates file, all very high (795 per cent or above), while many more show small but non-negligible exports with zero tariffs; most notably “rest of the Middle East”, **xme**, with exports of US\$1.7 million. We found that such cases arose from a combination of three factors:

- In the countries concerned, cross-border exports to Japan are zero, but expenditures by Japanese travelers are non-zero (in allocating travelers’ expenditures across commodities, we assume that in countries in which domestic residents consume some paddy rice, foreign travelers do likewise).
- In calculating regional rates of protection (in the protection module of the data construction program), we set to zero all tariffs on zero trade flows.
- In that calculation, our trade data exclude travelers’ expenditures.

In fitting the I-O tables, however, we apply the regional tariff rates not just to cross-border trade but to all imports.

For regions like “rest of Middle East”, therefore, we get the right result for the wrong reason. Import duties should be zero because imports represent travelers’ expenditures; they are zero because we set and apply a zero cross-border tariff rate.

For some countries, our final tariff is too high. For China, for example, paddy rice exports to Japan are eighty per cent travelers’ expenditures and twenty per cent cross-border trade. We apply the cross-border tariff, one thousand per cent, to the whole; the correct tariff rate, the cross-mode average, is two hundred per cent.

Clearly, our procedures are in error here. In adjusting the I-O tables to the international data sets, in estimating duty-paid import values, we should apply import tariffs to cross-border trade only (the point has been made earlier, in a broader context, by David Laborde). It would be desirable also for the protection module to preserve non-zero tariffs on zero trade flows; this would guard against error in case of downstream revisions to the trade data, such as those currently applying to energy commodities. Better still, aggregation of tariffs from countries to regions might be postponed until all trade adjustments have been made.

Correctly to model flows in which both cross-border trade and travelers’ expenditures are considerable, and cross-border trade is dutied, we should extend the GTAP theoretical structure to recognize travelers’ expenditures as a distinct mode of trade. We have no plans to do so. But even without such an extension, it might be worthwhile to record the division of trade between cross-border and travelers’ expenditures in the standard GTAP data base. Amongst other purposes, this would serve to explain tariffs that might otherwise appear anomalously low.

A point that emerged in investigation is that though trade in paddy (or “rough”) rice is small, it is not marginal. On the reasons for the low level of trade, the ERS comments:

The United States is the only major exporter that allows rough rice exports. Other exporters restrict rough rice shipments in an attempt to protect their domestic milling industries. (ERS/USDA *Briefing Room — Rice: Trade*, <http://www.ers.usda.gov/Briefing/Rice/trade.htm>)

On the level of paddy rice trade, the FAO reports a quantity share of 4 per cent of global trade in 2001–2003 (FAO, *International Trade in Rice, Recent Developments and Prospects*, http://www.fao.org/es/ESC/en/20953/21026/highlight_105938en.html). The RICEFLOW model’s 2000 baseline shows puts the share at 4.5 per cent (Eric J. Wailes, *Implications of the WTO Doha Round for the Rice Sector*, <http://www.fao.org/rice2004/en/pdf/wailes.pdf>). The latter author remarks that “Most of the trade in brown and paddy rice . . . goes to nations that have high tariffs on brown and paddy, but even higher tariffs on milled rice”, and puts the trade-weighted tariff on paddy rice at 16.9 per cent. In short, paddy rice is a well established, though minor, and heavily dutied, commodity in international trade.

Not clear is how much difference a change in our classification will make to the GTAP trade level. The FAO puts “husked rice” at 4 per cent by volume of total rice trade, while RICEFLOW puts “brown rice” at 5.8 per cent. So paddy and husked together comprise 8

per cent by the FAO, or 10.4 per cent in RICEFLOW. This seems hard to reconcile with the 25 per cent by value in GTAP 6, or even the 15 per cent in GTAP 7 prelease 3. So the reduction in paddy rice trade might be quite different from the 50–56 per cent that the FAO and RICEFLOW data would suggest.

Recommended actions are:

1. Revise the GTAP sectoral classification, and associated concordances, to include husked rice in `pcr` rather than `pdr`.
2. In the protection module, preserve tariffs on zero flows.
3. In the energy module, use country-level tariff data, and adjust the trade energy trade matrices at the country level.
4. Until final assembly of the data file, preserve the distinction between cross-border trade and travelers' expenditures. In particular, in calculating target levels of imports at basic prices, apply tariffs to cross-border trade only.
5. Report cross-border trade and travelers' expenditures separately in the GTAP data base.

Item 1 might best be undertaken about the beginning of the GTAP 8 cycle. The remaining items might also be undertaken within that cycle, though some preparatory work, such as preservation of country-level data to a later stage in the energy data processing, might conveniently be done within the current (GTAP 7) cycle.