Problem Report on PCR and PDR by David Laborde

Dear all,

Since I am currently working on tariff escalation and specific commodity shock, I have started to investigate more some intersectoral links.

I will start today with PCR and PDR and unfortunately some very odd numbers lead to erroneous results. Since this issue concerns several studies (Doha liberalization, Trade in Asia but also poverty impacts and land use, indeed this sectors is highly distorted and important for poor people), I cc several colleagues.

I will emphasize some problems, then will conclude by some potential remedies.

- The problems

First there is the cases where pcr is mainly autoconsuming pcr. Of course it is a serious problem when pdr is not consumed at the same time since the pcr sector is therefore strongly disconnected from the agricultural sectors and the land market. But since we know that the land for rice is quite different from other land type, we can think that CGE implications of this mistake are limited.

Therefore, my main concerns focus on other issues:

- For China (rice is not an unimportant commodity), we see that PCR is using 11% of Fisheries as Intermediate Inputs...

- Laos : 18% of fisheries, 10% in cattle and 6% in other animal products

- Malaysia: 8% in v_f, 16% in OCR

- Singapore 0.2% from PDR but 30% from V_F

- India (a big producer) only 34% from PDR. Why not but the large share of chemical products seems strange.

- Canada (small producer but still...) only 0.6% from PDR but 36.6% form V_F and 23% from OAP.

- USA 7.4% from PDR but 8.2% from Wheat ! More wheat than paddy rice to produce processed rice...

- Many South American countries display similar oddities

- In Europe, Italy is strange but still more or less ok, but France and Germany are wrong for sure. Bulgaria too and it is an important producer. Ukraine also.

- In Africa, the major issue is Senegal since once, again no pdr is used but 16% of PCR's IC are Wheat... I want to emphasize this example since by using nearly no local agricultural production and by exporting PDR, the Senegal can benefit a lot from trade liberalization in the rice sector without any land use constraint....

Nigeria is still using 28% of fisheries as IC to produce PDR... Uganda is using wheat and v_f... and many other African IO display the same oddities than in Asian IO. Do they have inherited some coefficients? For Ethiopia, the only IC is wheat but since the production is close to 0 in the database (in reality, there is a small production, relatively to other crops).

--- Solutions

Let's emphasize that we are speaking of processed rice. I have no problem to imagine some fancy imputs for the Paddy rice, in particular due to some joint productions (rice+fish farms). But when we speak about Processed rice, the technology should be more consistant with some expectations.

I have performed several checks for documented IOs. Most of the problems are related to bad splitting of agricultural sectors and agrifood branch from the original IO tables.

I will make two proposals to deal with the issue:

1) Always aggregate PCR and PDR to avoid the strange diagonal values and link the final product to the agricultural production block

2) That GTAP imposes explicitly some coefficients to correct IO tables for which the rice sector was not a separated sector in the source IO.

Response to this by Robert McDOugall

> First there is the cases where pcr is mainly autoconsuming pcr. Of > course it is a serious problem when pdr is not consumed at the same time > since the pcr sector is therefore strongly disconnected from the > agricultural sectors and the land market. But since we know that the > land for rice is quite different from other land type, we can think that > CGE implications of this mistake are limited.

There's a more general argument that excessive autoconsumption doesn't matter much. For analytical purposes, autoconsumption can be netted out. Roughly speaking, we can zero it out from the I-O table, and just consider net output (output net of autoconsumption) as a product of net input (input net of autoconsumption). It gets more complicated if there is commodity tax on autoconsumption, but that acts somewhat like production tax. So if the only defect of an industry's cost structure is excessive autoconsumption, the industry should behave reasonably in most scenarios.

On the other hand, if excessive autoconsumption results from problems in I-O table construction, it's likely that those problems have resulted in other and more substantive defects.

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I haven't succeeded in reproducing your shares, but the "SF01" shares from 'gsdview.har' are close.

> I have performed several checks for documented IOs. Most of the problems > are related to bad splitting of agricultural sectors and agrifood branch > from the original IO tables.

Of the examples I've looked at, about half reflect poor disaggregation, and half reflect problems in the contributed data.

The splitting problems result from a known limitation of the disaggregation program. Specifically, in disaggregating agriculture and food processing, we use industry-specific cost shares only for agricultural

inputs. "Agricultural" is defined quite narrowly, so, for instance, we don't use information on fish or chemicals inputs. Then, in China, in splitting rice processing out of food processing, we let both "other food processing" and rice processing use fish; in India, in separating rice growing and rice processing, we let both rice growing and rice processing use chemicals; and so on.

> 2) That GTAP imposes explicitly some coefficients to correct IO tables
> for which the rice sector was not a separated sector in the source IO.

Our usual approach to severe cost structure problems in the contributed table is first (A) to raise them with the contributor; if that is not productive, then (B) to aggregate the problem sectors with selected other sectors in the contributed table. Then the disaggregation program applies independent data to disaggregate them. Unfortunately, plan B would not work so well here, because of the disaggregation program limitation described above.

We have in the design stage a new approach to I-O table disaggregation that would remove that limitation, and address other known issues. It involves using the "representative table" as a source of cost shares for non-agricultural inputs into rice growing and rice processing. It does unfortunately entail a thorough reorganization of the existing program; I hope nevertheless we can implement it for release 8.