Chapter 8.C

Agricultural Production Targeting

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8.C.1 Background

Agricultural production targeting is a procedure applied to certain I-O tables before the main data construction phase. Except for its agricultural orientation, it is unrelated to the agricultural I-O data disaggregation discussed in sub-chapters 8.A and 8.B of this chapter. Rather, it arises from concerns that arose with the GTAP 5 Data Base, that in the data for European Union (EU) member countries there were considerable inaccuracies in levels and international distribution of agricultural production, and, consequently, in the budgetary cost of assistance. This led to problems in analysis of EU agricultural reform.

Investigation revealed that these inaccuracies largely reflected discrepancies between the representation of agriculture in the contributed I-O tables for EU member countries (van Leeuwen, 2002) and EUROSTAT production data relied upon by EU stakeholders. These arose partly from differences in reference years (the I-O data being older), but more from basic data differences.

In response, a special version of the GTAP Data Base was prepared for exclusive use of GTAP Consortium members, in which the agricultural production levels in EU member countries were revised. The revisions were made not within the data base construction procedure itself but as adjustments to the I-O tables entering into the procedure. In GTAP 6, this targeting was incorporated for the first time into a public data release. Since then, Consortium members interested in agricultural policy analysis have pressed for the extension of the targeting to non-EU countries.

The EU tables processed in the initial application provided full GTAP sectoral detail, and the original implementation of the procedure relied on such provision. We now find ourselves applying it to regions whose contributed tables require disaggregation. Rather than enhance the procedure to remove this limitation, we work around it by performing a partial run of the main GTAP data construction procedure, up to and including I-O table fitting, input the fitted tables into the production targeting procedure. The tables input into the production targeting procedure are therefore fully disaggregated, and also cleaned and fitted. That they are fitted is not strictly necessary, but we hope that it may minimize the deviations from the production targets within the main build, discussed in sections 8.C.2 and 8.C.5 below. The tables output from the targeting procedure are then fed into a complete and final run of the main construction procedure.

For GTAP 8, we apply production targets, supplied by Hsin Huang of the Organization for Economic Cooperation and Development, to thirty-seven countries (listed in table 8.C.1) and twelve commodities (table 8.C.2).

8.C.2 Overview

The purpose of the procedure is to adjust the I-O tables to match the agricultural production targets. But circumstances complicate the situation. The adjustment is done before the data base construction procedure, but parts of that procedure, especially I-O table fitting (chapter 15) affect agricultural production levels in the I-O tables. In some cases, the agricultural production targets are incompatible with other data targets, more specifically, with export targets. And since the procedure was originally designed to deal with raw I-O tables that have not undergone the cleaning procedures described in chapter 7, it contains safeguards against anomalous conditions that could abort processing.

Table 8.C.1 Countries Subject to Agricultural Production Targeting

Code	Region Name	Code	Region Name
AUS	Australia	IRL	Ireland
NZL	New Zealand	ITA	Italy
JPN	Japan	CYP	Cyprus
KOR	Korea	LVA	Latvia
USA	United States	LTU	Lithuania
CAN	Canada	LUX	Luxembourg
MEX	Mexico	HUN	Hungary
NOR	Norway	MLT	Malta
CHE	Switzerland	NLD	Netherlands
TUR	Turkey	AUT	Austria
BGR	Bulgaria	POL	Poland
ROU	Romania	PRT	Portugal
BEL	Belgium	SVN	Slovenia
CZE	Czech Republic	SVK	Slovakia
DNK	Denmark	FIN	Finland
DEU	Germany	SWE	Sweden
EST	Estonia	GBR	United Kingdom
GRC	Greece	FRA	France
ESP	Spain		

Table 8.C.2 Commodities Subject to Agricultural Production Targeting

Code	Description	Code	Description
PDR	Paddy rice	C_B	Sugar cane, sugar beet
WHT	Wheat	OCR	Crops n.e.c.
GRO	Cereal grains n.e.c.	CTL	Bovine cattle, sheep and goats, horses
OSD	Oil seeds	OAP	Animal products n.e.c.
V_F	Vegetables, fruit, nuts	WOL	Wool, silk-worm cocoons
PFB	Plant based fibers	RMK	Raw Milk

In the data base construction process, there are many steps that affect agricultural production levels in the I-O data, but the main step is the fitting I-O tables to international datasets. Here again, there are many factors that affect agricultural production levels, but three of these are dominant: the targeting of GDP, exports, and production taxes. GDP targeting is achieved in effect by rescaling the whole I-O table, so it affects production levels for all commodities. Changes in exports entail corresponding changes in production levels. Changes in production tax rates imply changes in either input or output values; an increase in the production tax rate, for instance, can be achieved either by increasing the money value of output or by reducing the money values of the intermediate and factor inputs. In practice, it is achieved by a combination of the two, leaning toward output value changes for domestically-oriented sectors and input value changes for export-oriented sectors.

It would be futile to target production levels in the incoming I-O tables if these were then altered drastically by the GDP, export, and production tax targeting. We therefore anticipate these adjustments in the production level targeting: we adjust not the production levels only but GDP, exports, and production taxes also. The tables going into the FIT process should therefore require little adjustment in these variables; we may then hope that the FIT process will have little effect on agricultural production levels.

As the agricultural production targeting is done outside and before the main data construction procedure, it uses early versions of the macroeconomic, trade, and protection data. In particular, the trade data used in the production targeting is not the same as those finally used in GTAP 8 itself.

The attempt to anticipate the FIT export adjustments exposes another problem. In some cases, the export and agricultural production targets are simply incompatible. We encounter both *hard inconsistencies*, where the export target exceeds the production target, and *soft inconsistencies*, where the export target is lower than the production target, but still leaves very little domestic product available to the domestic market. Since the trade data are central to the whole data reconciliation process, in these cases, it is the production targets not the export targets that must give way. Accordingly, in such cases, we adjust the production targets before applying them to the I-O data.

To operationalize the concept of soft inconsistency, we deem a soft inconsistency to exist if the production target is less than the export target plus one quarter of the initial level of domestic absorption. But it would be meaningless to use the absorption level from the initial table, since that table may have any scale. So before testing for inconsistencies, we scale the I-O

tables to match the GDP target. Having identified the inconsistencies, we then adjust the inconsistent production targets to exports plus one quarter of initial domestic absorption. In other words, we permit the production targeting to remove no more than three quarters of initial domestic absorption.

The general outline of operations is therefore:

— Clean the I-O tables.

— Adjust the tables to match the GDP targets.

— Identify inconsistencies between export and production and export targets; adjust the production targets.

— Adjust the tables to match export, output subsidy, and agricultural production targets.

We discuss the handling of export-production inconsistencies further in section 8.C.3, and the production adjustments themselves in section 8.C.4. Finally, in section 8.C.5, we see how well the production targets are maintained in the data base construction program.

8.C.3 Export-Production Inconsistencies

For the 2004 base year, 140 targets are adjusted which is about 32 per cent of the total. These include 90 adjustments for hard inconsistencies, and 50 for soft. An example of a hard inconsistency is the German “Plant-based fibers” sector; here the production target of zero is insufficient to cover exports of $43 million. An example of a soft inconsistency is the Mexican wheat sector; with production of $366 million, we can accommodate exports of $105 million. The number of targets increased slightly for the 2007 base year to reach 152, about 35 percent of the total. The total number of hard target adjustments declined slightly to 87.

Although so many of the targets are adjusted, targets for many of the largest sectors undergo no adjustment. In fact, the total target, summed over sectors and countries, increases by only 1.4 per cent for 2004 and by 1.2 percent for the 2007 base year. So although the adjustments are quite severe in some individual cases, overall the targets are well maintained.

Tables 8.C.3a and 8.C.3b reports some of the more notable adjustments for 2004 and 2007 base years, respectively. Here and in subsequent tables, we select the items for which changes or differences are most significant, where the criterion for “most significant” takes account both of the absolute magnitude of the item and the relative magnitude of the change or difference. We see that adjustments are more prevalent among non-EU countries, and for the commodities *pfb* (plant-based fibers), *wol* (wool), *osd* (oilseeds), and *wht* (wheat).

Table 8.C.3a Production Target Adjustments for 2004: Selected Cases (US$ million)

GTAP Region	Sector	Domestic Absorption	Exports	Initial Production Target	Adjusted Production Target
DEU	PFB	827	43	0	250
CAN	WHT	2225	2940	2638	3496
FRA	WOL	13	21	7	24
BEL	V_F	545	2458	1638	2594
CHE	OSD	150	160	60	196
ITA	PFB	560	19	1	159
SWE	PFB	104	2	0	28
BEL	PFB	164	38	26	79
CAN	WOL	111	3	0	31
CHE	GRO	470	196	161	313
NLD	WOL	3	28	6	29
BGR	PDR	97	0	6	25
HUN	PDR	15	0	2	4
PRT	PDR	118	3	30	33
MEX	WHT	1199	105	366	405
BEL	WHT	609	129	257	281
MEX	V_F	608	24	28	10775
ESP	PFB	831	96	100	304
CZE	CTL	600	49	181	492
TUR	WOL	266	10	0	76

Table 8.C.3b Production Target Adjustments for 2007: Selected Cases (US$ million)

GTAP Region	Sector	Domestic Absorption	Exports	Initial Production Target	Adjusted Production Target
GBR	PDR	9	9	0	11
BEL	PDR	2	19	0	20
ROU	WHT	4136	68	752	1102
BEL	V_F	295	2587	2127	2661
NOR	OSD	23	21	0	21
IRL	OSD	79	12	0	32
BEL	OSD	15	193	21	197
ITA	PFB	135	13	1	47
GBR	PFB	118	38	1	68
CAN	WOL	115	2	0	41
BEL	WOL	1	20	0	20
NLD	OSD	1991	5	4	503
BGR	PDR	158	1	10	40
ITA	PDR	2569	79	508	722
FRA	PDR	137	18	37	52
BGR	WHT	997	80	149	425
CHE	V_F	2363	37	604	627
MEX	OSD	569	17	30	160
BGR	OSD	431	160	239	267
ROU	RMK	7266	3	1782	1820

8.C.4 Production Adjustments

Table 8.C.4a and 8.C.4b show the effects of the production adjustments for the two base years respectively. We compare the adjusted production levels (fifth column) not to the original levels but to those that would have been obtained had just the export and production subsidy adjustments been applied (fourth column). We also report the production levels without production, export or production subsidy adjustments but after GDP scaling (third column).

We find that the largest adjustments are concentrated in a few countries, the United States, France, and Italy (though especially for the United States, this reflects partly the larger size of the economy). Large adjustments are especially common for *v_f*, vegetables and fruits, and *rmk*, raw milk. Although there are some upward adjustments (for example, *ocr*, other crops, in Mexico), most adjustments are downward. Overall, in the countries subject to targeting, agricultural production falls by 30 per cent for 2004 base year and by 28 percent for the 2007 base year.

Table 8.C.4a Production Adjustments for 2004: Selected Cases (US$ million)

GTAP Region	Sector	Scaled	Without Production Adjustments	With Production Adjustments
USA	CTL	84061	79335	35161
USA	GRO	58399	62242	25829
GBR	OCR	7302	8006	2132
FRA	CTL	20205	17894	8652
TUR	RMK	9891	10425	3805
USA	WHT	13912	18124	9010
FRA	V_F	14087	15733	7936
ITA	RMK	11524	11767	5403
MEX	OCR	8779	858	3997
USA	PFB	11477	13082	6444
TUR	OSD	4257	4235	1075
AUS	WOL	6528	7100	2693
USA	RMK	40137	39255	27429
FRA	OAP	15876	15630	8720
POL	OCR	3916	4066	1087
ITA	OAP	13610	13765	7453
GRC	OCR	5253	4922	1556
CHE	RMK	4157	5117	1665
TUR	V_F	22482	23390	15735
JPN	V_F	37189	36053	26400

Table 8.C.4b Production Adjustments for 2007: Selected Cases (US$ million)

GTAP Region	Sector	Scaled	Without Production Adjustments	With Production Adjustments
USA	CTL	98869	94045	40730
GBR	OCR	8975	9565	2472
FRA	CTL	25084	21971	10480
ROU	GRO	7766	8082	2037
ROU	RMK	7283	7528	1820
POL	OCR	6521	6849	1868
FRA	OAP	19931	19289	9940
USA	V_F	42761	45963	64120
MEX	OCR	860	1094	4993
ITA	RMK	13134	13200	6018
AUS	WOL	9076	9129	3627
ITA	OAP	16535	16504	8726
GRC	OCR	6938	6101	1992
ROU	WHT	4211	4365	1102
POL	OAP	12436	12883	6608
FRA	V_F	14827	16882	9780
CAN	OCR	6005	5539	1948
CHE	RMK	4681	5390	1877
USA	GRO	66162	73124	57633
NLD	OCR	13647	17000	10145

8.C.5 Deviations from Targets in the Main Data Base Construction Program

As noted above, the production adjustment is performed before the main data construction program. The adjusted targets are attained quite accurately within the adjustment program itself, but nothing in the main program guarantees that they will be maintained through the regular I-O processing. In tables 8.C.5a and 8.C.5b, therefore, we examine the largest deviations between the production targets and the final data.

Overall, with a few notable exceptions (Romania Oilseeds, Dutch other-grains, for both base years), deviations from target are not extreme. Bearing in mind that the differences presented are those considered most serious, we may say that the targets are well maintained. There is a slight general upward bias in the errors: overall, agricultural production for the targeted countries exceeds the target by about 1.2 per cent for the 2004 base year and by about 4 per cent for the 2007 base year.

Table 8.C.5a Deviations from Production Targets for 2004: Selected Cases (US$ million)

GTAP Region	Sector	Target	Final
ITA	OCR	12069	17624
FRA	WHT	9032	11992
ROU	OAP	2953	1602
AUS	OSD	617	1369
ESP	OCR	6398	8482
ITA	CTL	4873	3371
ROU	OSD	523	1189
NLD	GRO	113	461
ESP	OSD	2932	4169
ROU	V_F	5762	4300
USA	GRO	57633	53211
ESP	V_F	18006	15698
DEU	OCR	12896	14844
FRA	OCR	21210	23592
ITA	V_F	15220	13351
FRA	CTL	10480	9126
DEU	CTL	5257	4339
POL	CTL	1383	953
JPN	WHT	299	557
BGR	OCR	401	691

Table 8.C.5b Deviations from Production Targets for 2007: Selected Cases (US$ million)

GTAP Region	Sector	Target	Final
ITA	OCR	12261	18585
JPN	WHT	513	2188
ESP	OSD	2985	5487
ROU	OCR	4821	7731
ROU	OSD	461	1318
ESP	OCR	6393	8783
USA	PFB	6444	8746
AUS	OSD	522	1242
GRC	OCR	1556	2571
ROU	OAP	2220	1311
FRA	WHT	4838	6462
ITA	CTL	4149	2933
LTU	OCR	174	514
GRC	OSD	1301	2063
NLD	GRO	74	307
JPN	OSD	400	818
ITA	OSD	2920	3916
ITA	V_F	14047	12139
ESP	V_F	15181	13232
FRA	OCR	19401	21710

References

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