

15.B

Reconciling Merchandise Trade Data

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This chapter provides information on specific problems in the source data affecting reliability of reported trade data used in GTAP 6 Data Base. Statistics are provided on the most critical features of global bilateral trade for the 2001 base year along with comparisons of previous years. Each of these features is addressed in the following sections. These include availability of reporters, problems associated with misclassification of commodities and unspecified partners, and sector-specific reporting variations. The chapter also includes a description of how the standard method of reconciling merchandise trade is used to improve reported bilateral trade flows.

15.B.1 Reporting Status of Countries

The primary source for bilateral merchandise trade is COMTRADE, provided by the United Nation's Statistical Division. Global coverage in bilateral commodity trade is dependent on country availability as reported by individual countries in COMTRADE. An improvement in the 2001 base year over the 1997 base year comes from a greater number of country reporters. The number of reporting countries that provides trade data to the U.N. steadily increases. Of some 214 potential reporter countries, 149 countries reported trade under the HS classification system while 151 countries reported under the SITC classification (table 15.B.1). In order for a country to qualify as a valid reporter for use in the GTAP Data Base, the country must report sufficient commodity detail with its partner countries. For this reason, not all reporters in COMTRADE were used in the GTAP trade data. For example, Vietnam is a reporting country in COMTRADE for 2001. It however remains as a non-reporting country for use in GTAP trade data (table 15.B.2) because the trade data that Vietnam supplies to the U.N is reported at a more aggregate level (SITC 3-digit) which will not accommodate the GTAP sector classification, which requires classification at no less than 4-digits under the SITC classification.

The main benefit of having the greatest number of countries reporting bilateral trade in the source data is that it greatly diminishes the problem of zero trade flows between non-reporting trading partners. Unusually late reporting by some countries for the 2001 year presented this problem in the initial pre-release version of the GTAP Data Base. There still remain cases where the actual level of trade is most likely more than what is found in GTAP trade data due to insufficient reporting among important non-reporting partners. This is a problem particularly for intra-regional trade flows of Sub-Saharan Africa. Estimates are not made for missing trade occurring between non-reporting countries. For example, trade that took place between Chad, Cote d'Ivoire, Liberia, Ghana, Guinea-Bissau, Mauritania, Sierra Leone, and the Republic of Congo is completely missing in the GTAP

Data Base. This is because all of these countries are non-reporters in the source data as shown in appendix table 15 B.A1. This is also a similar problem with trade among the former Soviet States. However there has been some improvement in country reporting in 2001 for this region with new reporting countries that now include Azerbaijan, Belarus, Georgia, and Ukraine. These countries were all non-reporters in the 1997 base year of the GTAP 5 Data Base. Most countries in Eastern Europe are now regular reporters in COMTRADE with the exception of Bosnia-Herzegovina, which started reporting only in 2003.

Table 15.B.1 Number of Reporting Countries by Classification System, 1992-2002

Year	HS 92/88	SITC Rev. 3
1992	55	90
1993	70	102
1994	100	112
1995	116	123
1996	125	130
1997	134	136
1998	134	138
1999	143	148
2000	147	153
2001	149	151
2002	139	143

Reporting status as of March 2005, U.N. Statistical Division, COMTRADE

15.B.2 Unclassified Commodities and Unspecified Partners

Although country coverage expanded in the 2001 base year there were several major factors contributing to the instability of bilateral commodity trade. The most common problem is countries failing to properly classify detailed commodities. Another problem is that countries fail to properly identify their trading partners. This arises because countries have the option of reporting commodities as unclassified and partners as unspecified when reporting total trade for merchandise imports and exports. Since the GTAP trade data requires bilateral commodity flows, unclassified commodities and partners are problematic. The level of trade and shares of unclassified commodities and unspecified partners rose sharply between 1997 and 2001 (table 15.B.2.) The problem did not arise from new reporting countries or from growth of trade originating in developing countries (table 15.B.3). On the contrary some of the largest developed countries such the U.S. Japan, and the United Kingdom were major contributors of unclassified commodity trade in 2001. In 1997, both developed countries and developing countries contributed the same proportion (2.7 percent) of unclassified commodity trade. In 2001 the developed country's share of unclassified commodities rose to 3.6 percent while developing countries reported a smaller proportion of unclassified trade (1.5 percent).

Table 15.B.2 Total Unclassified Commodities and Unspecified Partners in Reported Global Merchandise Trade

Year	Unspecified Partners		Unclassified Commodities	
	U.S. \$ Billions	Share of Total	U.S. \$ Billions	Share of Total
1992	21.2	0.8	66.1	1.9
1993	22.3	0.8	77.0	2.3
1994	20.0	0.5	85.2	2.2
1995	18.1	0.4	125.9	2.7
1996	30.4	0.6	122.8	2.5
1997	38.9	0.8	137.3	2.7
1998	67.2	1.3	139.5	2.7
1999	49.4	0.9	141.6	2.7
2000	140.2	2.4	159.6	2.7
2001	87.6	1.5	166.5	2.9
2002	78.0	1.3	152.3	2.6

Note: Total trade is the sum of specified, unspecified, classified and unclassified trade reported by all countries

Table 15.B.3 Unclassified Commodity Trade for Developed and Developing Countries

Countries	1997		2001	
	U.S. \$ Billions	Share of Country Total (%)	U.S. \$ Billions	Share of Country Total (%)
Developing Countries	45	2.7	29	1.5
Developed Countries	92	2.7	138	3.6
United States	19	2.9	23	3.4
Japan	11	2.7	16	4.0
European Union	55	2.6	75	3.4
United Kingdom	2	0.6	20	6.8

The implication of unclassified or miss-classified commodity trade is that it lowers a country's reported sector total since the trade is missing in detailed commodities. Table 15.B.4 provides examples of where countries fail to classify commodities. Some of the reductions in reported merchandise totals are the result of commodity classification problems. In 1997 Australia reported sugar exports of \$1.2 billion. However in 2001, Australia reported sugar exports of only \$40 million. This is attributed to commodity classification at the commodity level. Specifically, at the detailed commodity level (HS 170111-Raw cane sugar), Australia reported \$1.1 billion in 1997 but only \$2.2 million in 2001. The Netherlands reported gas (HS 271111-Natural gas in gaseous state) of \$4 billion but failed to report gas entirely in 2001. Similarly, there were significant reductions in reported sector totals and total merchandise for the United Kingdom and Japan.

Table 15.B.4 Selected Examples Where Classification of Commodities Reduces 2002 Reported Export Totals (2001 U.S. \$ Billions)

Exporting Reporter	GTAP Sector	1997	2000	2001	2002
Australia	Sugar	1.20	0.05	0.04	0.04
Netherlands	Gas	4	4	0	0
United Kingdom	Motor vehicles and parts	27	26	23	28
United Kingdom	Total merchandise	265	264	257	271
Japan	Total merchandise	404	457	383	398

Note: Totals are reported as GTAP sectors by each exporting country

15.B.3 Variability in Sector and Global Merchandise Trade

One measure of the quality of the unreconciled reported bilateral commodity trade is the variation or range of possible values found in reported trade. The range of possible trade values is generated from discrepancies between reporting partners. Variation can be calculated at the bilateral, sectoral, and global levels. A reduction over time in the range of values in reported trade relative to the level of global trade would indicate improvement in data quality. Greater confidence can be placed on trade flows. However, when the size of the discrepancies increases relative to level of trade, this is an indication of deteriorating quality in the reported source data. This would make reconciling of discrepant trade flows all the more important for ensuring confidence in bilateral commodity trade.

An estimate of reporting variation across GTAP sectors is provided in table 15.B.5. A maximum value is the sum of all the higher reported values for all bilateral trade flows. A minimum value is the sum of all lower reported values for all bilateral trade flows. The difference between the reported global maximum value and the minimum value is the absolute range. In 2001 the maximum and the minimum values in global reported merchandise trade in COMTRADE were \$6.5 trillion and \$4.9 trillion, respectively, giving a range of \$1.6 trillion. The standard range, calculated as the variation divided by of the average global value, is 28 percent. In comparison to reported trade in 1997 (25 percent range), there was an increase of 3 percentage points indicating the reported 2001 data is more variable than what countries reported in 1997. However, each sector shows differences in variability with not all sectors having a higher reporting variation in 2001. This is because each sector has unique reporting problems. Such problems however can change over time. For example, the GTAP sector petroleum and coal products has consistently had the highest reporting variability as measured by the standard range (70 percent). The variability in reporting of this sector continued to increase from 1997 to 2001 (2 percentage points). While the paddy rice and the oilseed sectors show improvements in reporting variation, the sugar sector had a pronounced increase reporting variation as indicated by the change in the standard range from 26 percent in 1997 to 49 percent in 2001. There were increases in reporting variability for most manufacturing sectors including the most heavily traded sectors of electronic equipment, other machinery and equipment, and motor vehicles and parts. This is partly attributed to the growth in re-export trade.

15.B.4 Standard Procedures and Exceptions for Reconciling Trade

The procedure of reconciling trade flows is based on a selection process that measures each country's reliability based on its record of matching its trade with its partners. In all cases the more reliable reporter's trade is used over a less reliable partners. This same automated procedure that was used

Table 15.B.5 Reported Range for Global Sector Totals with Comparison of 2001 with 1997

GTAP Sector		2001			1997	Difference Percentage Point	
		Maximum (\$ Billions)	Minimum (\$ Billions)	Range (\$ Billions)	Standard Range (%)		
1	pdr	2	2	0.4	20	28	20
2	wht	16	13	16.4	25	17	8
3	gro	15	12	3.4	24	22	3
4	v_f	56	41	15.6	32	29	3
5	osd	18	14	3.8	24	36	-12
6	c_b	0	0	0.0	0	0	0
7	pfb	8	7	1.8	24	19	5
8	ocr	37	27	9.7	30	29	1
9	ctl	7	6	1.3	21	15	5
10	oap	16	12	3.8	26	25	1
12	wol	2	2	0.7	35	36	-1
13	for	11	8	3.5	36	32	4
14	fsh	13	9	3.6	33	40	-6
15	col	27	19	7.9	34	28	6
16	oil	377	293	84.5	25	14	11
17	gas	82	72	10.0	13	16	-3
18	omn	70	47	22.5	39	45	-7
19	cmt	20	17	3.1	17	16	1
20	omt	33	26	6.9	23	20	3
21	vol	32	24	8.3	30	33	-3
22	mil	33	27	5.7	19	20	-1
23	pcr	6	4	1.3	25	22	3
24	sgr	14	8	5.4	49	26	23
25	ofd	155	126	29.8	21	24	-3
26	b_t	60	47	12.8	24	28	-4
27	tex	232	173	59.2	29	26	4
28	wap	177	119	57.4	39	39	0
29	lea	99	62	37.0	46	46	-1
30	lum	133	106	26.7	22	20	3
31	ppp	160	131	28.7	20	17	2
32	p_c	91	44	47.3	70	68	2
33	crp	824	663	161.5	22	19	3
34	nmm	84	67	17.1	23	20	3
35	i_s	132	103	28.3	24	23	1
36	nfm	183	116	67.3	45	45	0
37	fmp	152	115	36.9	28	26	2
38	mvh	623	542	80.6	14	12	2
39	otn	252	149	102.8	51	49	2
40	ele	994	702	291.8	34	29	5
41	ome	1071	858	213.4	22	19	3
42	omf	161	95	66.0	51	50	2
43	ely	15	13	2.4	17	26	-10
Total		6,495	4,922	1572.6	28	25	3

Note: Reporting ranges are estimated at the reported unreconciled GTAP sector level. Maximum value is the global sum of the higher value reported for each bilateral trade flow. Minimum value is the sum of the lower value reported for each bilateral trade flow. Standard range is the range divided by a simple average reported value multiplied by 100.

in previous versions of the GTAP Data Base was applied to the 2001 base year data for the GTAP 6 Data Base. There was much evidence of irregularities found in reporting in the 2001 trade data. This may warrant a growing need for overriding the automated process on a case by case basis. This can be done as needed using industry-specific knowledge. Some examples are sugar, gas, and other petroleum products. The variation in reporting (shown in table 15.B.5) provides latitude for adjusting trade totals without the use of alternative data sources. In such cases where reconciled sector totals are not consistent with what is expected using industry statistics, corrective measures can be made as needed. For example, the reconciled global sugar trade total is less than what was expected. It was found that there are major mismatches between reporting countries and evidence of misclassification. In cases like that, the changes in the reconciled values can be altered by over-riding the general rule in the reconciliation process. In all cases neither the GTAP sector definition nor the primary source of data are compromised. Misclassification or unclassified commodities contributes to the problem of suspicious trade totals but there are other factors that must be recognized. The growth in re-export trade has become more important in affecting reporting variation. This topic is addressed in section 15.C. with a focus on Hong Kong and the Netherlands.

Appendix

Table 15.B.A1 Reporting and Non-reporting Countries in 2001

Count	Reported in 2001	Failed to Report in 2001
1		Afghanistan
2	Albania	
3	Algeria	
4		American Samoa
5	Andorra	
6		Angola
7		Anguilla
8		Antigua and Barbuda
9	Argentina	
10		Armenia
11		Aruba
12	Australia	
13	Austria	
14	Azerbaijan	
15	Bahamas, The	
16	Bahrain	
17	Bangladesh	
18	Barbados	
19	Belarus	
20	Belgium	
21	Belize	
22	Benin	
23		Bermuda
24		Bhutan
25	Bolivia	
26		Bosnia-Herzegovina
27	Botswana	
28	Brazil	
29		British Virgin Islands
30	Brunei	
31	Bulgaria	
32	Burkina	
33	Burundi	
34		Cambodia
35	Cameroon	
36	Canada	
37	Cape Verde	
38		Cayman Islands
39	Central African Republic	
40		Chad
41	Chile	
42	China	
43	Colombia	
44		Comoros
45		Congo, Dem. Rep.
46		Congo, Rep.
47		Cook Islands
48	Costa Rica	
49		Cote d'Ivoire

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Table 15.B.A1 Reporting and Non-reporting Countries in 2001 (Contd)

Count	Reported in 2001	Failed to Report in 2001
50	Croatia	
51	Cuba	
52	Cyprus	
53	Czech Republic	
54	Denmark	
55		Djibouti
56	Dominica	
57	Dominican Republic	
58	Ecuador	
59	Egypt	
60	El Salvador	
61		Equatorial Guinea
62		Eritrea
63	Estonia	
64	Ethiopia	
65		Falkland Islands
66		Faroe Islands
67		Fiji
68	Finland	
69	France	
70	French Polynesia	
71	Gabon	
72	Gambia, The	
73	Georgia	
74	Germany	
75		Ghana
76		Gibraltar
77	Greece	
78	Greenland	
79	Grenada	
80	Guatemala	
81	Guinea	
82		Guinea-Bissau
83	Guyana	
84		Haiti
85	Honduras	
86	Hong Kong	
87	Hungary	
88	Iceland	
89	India	
90	Indonesia	
91	Iran	
92		Iraq
93	Ireland	
94	Israel	
95	Italy	
96	Jamaica	
97	Japan	
98	Jordan	
99	Kazakhstan	
100	Kenya	

Continued

Table 15.B.A1 Reporting and Non-reporting Countries in 2001 (Contd)

Count	Reported in 2001	Failed to Report in 2001
101		Kiribati
102		Korea, North
103	Korea, Rep.	
104	Kuwait	
105		Kyrgyzstan
106		Lao PDR
107	Latvia	
108	Lebanon	
109	Lesotho	
110		Liberia
111		Libya
112	Lithuania	
113	Luxembourg	
114	Macau	
115	Macedonia, FYR	
116	Madagascar	
117	Malawi	
118	Malaysia	
119	Maldives Islands	
120	Mali	
121	Malta	
122		Marshal Islands
123		Mauritania
124	Mauritius	
125	Mexico	
126		Micronesia, Fed.Sts
127	Moldova	
128	Mongolia	
129		Montserrat
130	Morocco	
131	Mozambique	
132		Myanmar
133		Namibia
134		Nauru
135		Nepal
136	Netherlands	
137		Netherlands Antilles
138	New Caledonia	
139	New Zealand	
140	Nicaragua	
141	Niger	
142	Nigeria	
143		Niue
144		Norfolk Island
145		Northern Mariana Islands
146	Norway	
147	Oman	
148	Pakistan	
149		Palau
150		Palestinian Territory, Occupied
151	Panama	

Continued

Table 15.B.A1 Reporting and Non-reporting Countries in 2001 (Contd)

Count	Reported in 2001	Failed to Report in 2001
152	Papua New Guinea	
153	Paraguay	
154	Peru	
155	Philippines	
156	Poland	
157	Portugal	
158	Qatar	
159	Romania	
160	Russian Federation	
161	Rwanda	
162		Saint Helena
163	Samoa	
164	Sao Tome and Principe	
165	Saudi Arabia	
166	Senegal	
167	Seychelles	
168		Sierra Leone
169	Singapore	
170	Slovakia	
171	Slovenia	
172		Solomon Islands
173		Somalia
174	South Africa	
175	Spain	
176	Sri Lanka	
177	St. Christopher-Nevis	
178	St. Lucia	
179		St. Pierre and Miquelon
180	St. Vincent and the Grenadines	
181	Sudan	
182	Surinam	
183	Swaziland	
184	Sweden	
185	Switzerland	
186		Syria
187	Taiwan, China	
188		Tajikistan
189	Tanzania	
190	Thailand	
191	Togo	
192		Tokelau
193		Tonga
194	Trinidad and Tobago	
195	Tunisia	
196	Turkey	
197		Turkmenistan
198		Turks and Caicos Islands
199		Tuvalu
200	Uganda	

Table 15.B.A1 Reporting and Non-reporting Countries in 2001 (Contd)

Count	Reported in 2001	Failed to Report in 2001
201	Ukraine	
202	United Arab Emirates	
203	United Kingdom	
204	United States	
205	Uruguay	
206		Uzbekistan
207		Vanuatu
208	Venezuela	
209		Vietnam
210	Wallis and Futuna	
211		Yemen
212	Serbia and Montenegro	
213	Zambia	
214	Zimbabwe	