

Appendix to:
Intrafirm Trade and Vertical Fragmentation in U.S. Multinational Corporations
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A Data Appendix

A multinational firm's data typically span forms BE-10A, BE-10B (Long Form, LF), BE-10B (Short Form, SF), and BE-10B Mini.¹ Form BE-10A records data on the consolidated parent, and the various BE-10B forms are filed for each reporting affiliate. The long form is filed for non-bank majority-owned affiliates with sales, assets, or net income (loss) of more than \$150 million, while the short form is filed for non-bank majority-owned affiliates with sales, assets, or net income (loss) between \$25 million and \$150 million. Both minority-owned non-bank affiliates with sales, assets, or net income (loss) larger than \$25 million filing form BE-10(SF) and all non-bank affiliates with sales, assets, or net income (loss) between \$10 million and \$25 million filling the mini form are not required to report a detailed breakdown of their sales. For affiliates below the \$10 million threshold, the parent reports a few data items, including affiliate sales and employment.

The reporting threshold is low: Reporting affiliates account for 99 percent of total affiliate assets and sales. Columns 1 and 2 in table A1 report sales and employment for the universe of affiliates and the subset of affiliates that report.²

Given our data requirement, we construct a sample of non-bank majority-owned affiliates with sales, assets, or net income (loss) of more than \$25 million (MOFA25), using forms BE-10B(LF) and BE-10B(SF). We further restrict our attention to parent-affiliate pairs in the manufacturing sector.

Variables related to shipments of goods within the corporation are collected in several parts of the BEA surveys. We use the variable "affiliate's sales" broken down by transactor and destination, which is found in the response to question 100 of survey form BE-10B(SF) and question 54 of survey form BE-10B(LF). From these data, we construct the statistics related to shipments from affiliate to parent, to all affiliated parties, and to unaffiliated parties (local and non-local). For shipments from parent to affiliate, we use the variable "U.S. exports of goods to the affiliate" broken down by transactor, which is found in the response to question 97 of survey form BE-10B(SF) and question 173 of survey form BE-10B(LF). For the sub-sample of large affiliates answering the

¹The survey forms can be found at <http://www.bea.gov/surveys/diasurv.htm>.

²We do not consider the 2,606 affiliates with "carry" data (i.e., affiliates whose data were extrapolated from a previous survey); they represent eight percent of total reporting affiliate sales. None of the data used in our analysis are imputed data.

survey form BE-10B(LF), MOFA150, information on the types of goods shipped from the parent is also provided. We do not use this information in the paper — to keep consistency of the sample in all our variables— but we report this data in table A1 to show the importance of “goods for further processing” in total goods shipped from the parent to the affiliate. Notice that in column 6 in table A1, total exports from U.S. manufacturing parents to affiliates in manufacturing are imputed by BEA. This is because the parent reports exports to affiliates in form BE-10A consolidated across all its affiliates, not only in manufacturing.

Intra-MNC trade, as a share of total MNC sales, is constructed by summing the shipments from affiliates to all affiliated parties, including the parent, and shipments from the parent to its affiliates. Total MNC sales are constructed by summing sales of affiliates and parent sales, in our MOFA25 sample.³

Parents report sales in their ten largest industries of operation, and affiliates report sales in their seven largest industries. From these data, the BEA assigns each affiliate and parent a primary industry. This procedure is described in Bureau of Economic Analysis (2008, p. M–12). Briefly, the procedure begins with an affiliate’s sales at the two-digit industry level. Within the two-digit industry with the greatest sales, the three-digit industry with the greatest sales is chosen. Finally, within the three-digit industry with the greatest sales, the four-digit industry with the greatest sales is chosen as the primary industry of the affiliate. This procedure ensures that a firm does not jump across major classifications when its data are considered in a more aggregate classification.

Parent and affiliate data are reported at different levels of aggregation. Parent data consolidate all U.S.-located company operations that are part of the fully consolidated firm.⁴ Affiliates do not typically consolidate. Some exceptions are made for affiliates of the same parent — these affiliates may report in a consolidated manner if they are located in the same country and in the same four-digit industry. Affiliates never consolidate across countries.

A few remarks are in order. First, affiliate shipment data do not contain an industry identifier for the good being shipped. The lack of shipment-level industry classification, however, should

³Notice that ideally, we would like a measure that includes shipments to and from the parent, as well as to other affiliated parties, for all reporting affiliates in manufacturing. Unfortunately, form BE-10A, which is filed for the parent consolidating the information for *all* its affiliates, does not provide information on shipments from affiliates to affiliated parties other than the parent, and by consolidating across affiliates, the ability to distinguish affiliates in the manufacturing sector is lost.

⁴Since the parent is the consolidation of all domestic operations, while affiliates are generally not consolidated, there may be an overstatement of the extent of affiliate specialization relative to the parent. Consolidating the affiliates of a parent within a country creates a strictly comparable country-level affiliate. Doing so does not change our results much: The median country-level affiliate still operates in one industry, and the share of sales in the primary industry falls to 0.84.

not limit our analysis since the overwhelming majority of affiliates produce in a single industry and, hence, have only one four-digit product available to ship to related and unrelated parties. Second, within the “third countries” category, we know neither the identity of the individual affiliate in that country nor the identity of the countries to which the affiliate is shipping. In some cases, the data differentiate among Europe, Latin America, Africa, Middle East, Asia, the Pacific, and Canada; only affiliates in MOFA150 are required to report in this way. Third, sales are reported on a “shipped” basis: The data reported represent the physical flow of goods and services and not an accounting convention. The shipments data reflect the buyer and seller in the transaction and are not affected by the use of a third-party shipping company. Finally, while the affiliate sales data contain sales of both goods and services, the export data used for shipments from the parent to the affiliate contains only goods. It is reassuring, however, that for the subset of large affiliates in MOFA150 which are required to report sales of goods and services separately, shipments are almost exclusively in goods.

References

Bureau of Economic Analysis (2008), *U.S. Direct Investment Abroad, 2004 Final Benchmark Data*, U.S. Government Printing Office, Washington, D.C.

Table A1: Sample construction.

	Parent-affiliate in all non-bank sectors				Parent-affiliate in manufacturing			
	All (1)	Reporting (2)	MOFA25 (3)	MOFA150 (4)	All (5)	Reporting (6)	MOFA25 (7)	MOFA150 (8)
Number of affiliates	42,547	25,464	14,351	5,676	13,163	8,174	4,901	1,624
Number of parents	3,444	2,412	1,655	796	1,458	1,049	732	350
Total parent sales	7,517,056	7,207,894	6,480,819	5,296,402	3,089,663	3,032,798	2,781,424	2,437,787
Total parent employment	22,421	21,092	17,997	13,804	7,316	7,112	6,323	5,031
Total affiliate employment	10,445	10,149	7,230	5,100	4,645	4,529	3,276	2,280
Affiliate sales	3,976,341	3,939,894	3,045,381	2,584,692	1,705,472	1,691,359	1,303,610	1,111,641
to parent	—	298,611	270,225	246,318	—	152,726	137,050	123,719
to U.S. unaffiliated	—	—	55,989	46,260	—	—	25,943	21,425
to local unaffiliated	—	—	1,718,548	1,401,974	—	—	657,115	544,027
to local affiliated	—	—	169,559	149,973	—	—	91,463	80,717
to 3rd-country affiliated	—	—	462,697	420,991	—	—	253,059	230,379
to 3rd-country unaffiliated	—	—	368,361	319,175	—	—	138,980	111,374
Exports from parent to affiliate	—	169,448	136,515	109,779	—	102,738*	79,906	68,354
for further processing	—	—	—	63,791	—	—	—	58,431
for resale	—	—	—	40,948	—	—	—	6,944
Number of parent industries	197	192	181	160	76	76	74	66
Number of affiliate industries	202	200	194	182	77	77	77	74
Number of countries	200	173	159	118	150	124	104	76

Notes: Columns 1–4 include all non-bank parent-affiliate pairs, while columns 5–8 include only the parent-affiliate pairs in which the primary industry of both the parent and affiliate is in manufacturing. Columns 2 and 5 describe affiliates whose sales, assets, or net income (loss) is greater than \$10 million. Columns 3 and 7 describe majority-owned foreign affiliates (MOFA) whose sales, assets, or net income (loss) is greater than \$25 million. Columns 4 and 8 describe majority-owned foreign affiliates whose sales, assets, or net income (loss) is greater than \$150 million. *Value imputed by BEA for manufacturing affiliates of all non-bank parents. All other values are tabulated directly from the surveys. Sales are expressed in millions of dollars. Employment is expressed in thousands of employees.

B Additional Tables: Summary Statistics.

Table B1: Affiliate activities, summary by region.

	Number	Mean	Sd	p25	p50	p75
Share of affiliate sales to all affiliated parties						
All	4901	0.27	0.34	0.00	0.09	0.41
OECD	3084	0.26	0.34	0.00	0.10	0.41
non-OECD	1817	0.27	0.36	0.00	0.08	0.43
North America	634	0.29	0.36	0.00	0.12	0.48
Latin American not Mexico	400	0.19	0.29	0.00	0.04	0.25
Europe	2667	0.28	0.34	0.00	0.12	0.44
Africa	93	0.22	0.37	0.00	0.01	0.26
Middle East	45	0.33	0.40	0.00	0.13	0.66
Asia	1062	0.25	0.35	0.00	0.05	0.39
Share of affiliate sales to parent						
All	4901	0.07	0.19	0.00	0.00	0.02
OECD	3084	0.07	0.19	0.00	0.00	0.03
non-OECD	1817	0.07	0.20	0.00	0.00	0.02
North America	634	0.21	0.31	0.00	0.03	0.30
Latin American not Mexico	400	0.06	0.18	0.00	0.00	0.01
Europe	2667	0.04	0.13	0.00	0.00	0.01
Africa	93	0.05	0.18	0.00	0.00	0.00
Middle East	45	0.15	0.32	0.00	0.00	0.13
Asia	1062	0.07	0.21	0.00	0.00	0.01
Share of affiliate cogs from parent						
All	4901	0.06	0.15	0.00	0.00	0.04
OECD	3084	0.06	0.15	0.00	0.00	0.04
non-OECD	1817	0.06	0.15	0.00	0.00	0.04
North America	634	0.14	0.21	0.00	0.04	0.21
Latin American not Mexico	400	0.06	0.14	0.00	0.00	0.04
Europe	2667	0.04	0.12	0.00	0.00	0.01
Africa	93	0.03	0.09	0.00	0.00	0.01
Middle East	45	0.05	0.11	0.00	0.00	0.02
Asia	1062	0.09	0.18	0.00	0.00	0.07

Notes: The percentiles (p25, p50, and p75) are the averages of the eleven affiliates surrounding the percentile affiliate.

Table B2: Affiliate activities, summary by industry.

	Number	Mean	Sd	p25	p50	p75
Share of affiliate sales to affiliated parties [†]						
All	4901	0.27	0.34	0.00	0.09	0.41
Food, beverage, tobacco	481	0.20	0.32	0.00	0.02	0.25
Textile and apparel	89	0.24	0.34	0.00	0.04	0.40
Chemicals	1203	0.24	0.34	0.00	0.06	0.34
Glass and Stone	84	0.17	0.25	0.00	0.06	0.23
Metal	104	0.23	0.33	0.00	0.05	0.31
Metal products	201	0.25	0.30	0.01	0.12	0.39
Machinery	485	0.36	0.36	0.03	0.21	0.67
Electronics	570	0.31	0.38	0.00	0.10	0.57
Electrical equip.	208	0.37	0.38	0.03	0.22	0.76
Transportation equip.	630	0.25	0.31	0.00	0.11	0.38
Other	846	0.26	0.34	0.00	0.09	0.41
Share of affiliate sales to parent						
All	4901	0.07	0.19	0.00	0.00	0.02
Food, beverage, tobacco	481	0.03	0.12	0.00	0.00	0.00
Textile and apparel	89	0.07	0.23	0.00	0.00	0.00
Chemicals	1203	0.04	0.15	0.00	0.00	0.01
Glass and Stone	84	0.04	0.10	0.00	0.00	0.01
Metal	104	0.08	0.23	0.00	0.00	0.01
Metal products	201	0.08	0.17	0.00	0.01	0.05
Machinery	485	0.11	0.22	0.00	0.01	0.10
Electronics	570	0.14	0.28	0.00	0.00	0.09
Electrical equip.	208	0.11	0.24	0.00	0.00	0.07
Transportation equip.	630	0.08	0.21	0.00	0.00	0.03
Other	846	0.05	0.16	0.00	0.00	0.01
Share of affiliate cogs from parent						
All	4901	0.06	0.15	0.00	0.00	0.04
Food, beverage, tobacco	481	0.01	0.05	0.00	0.00	0.00
Textile and apparel	89	0.05	0.16	0.00	0.00	0.01
Chemicals	1203	0.06	0.14	0.00	0.00	0.04
Glass and Stone	84	0.06	0.14	0.00	0.00	0.03
Metal	104	0.06	0.15	0.00	0.00	0.03
Metal products	201	0.07	0.15	0.00	0.01	0.07
Machinery	485	0.07	0.16	0.00	0.00	0.07
Electronics	570	0.10	0.22	0.00	0.00	0.08
Electrical equip.	208	0.10	0.21	0.00	0.00	0.06
Transportation equip.	630	0.04	0.13	0.00	0.00	0.02
Other	846	0.07	0.14	0.00	0.00	0.06

Notes: The percentiles (p25, p50, and p75) are the averages of the eleven affiliates surrounding the percentile affiliate.